

# modern machine shop

## AUTOMATION

See Page 105

## HYDROSPINNING

See Page 122

## IDENTIFYING STEELS

See Page 140

MAY 1955

*Now*

Available from stock

## TWO NEW PRODUCTS



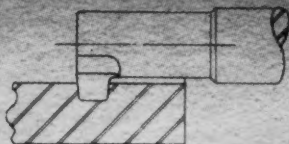
—made to standard specifications of ring manufacturers and available from stock. High speed steel and carbide tipped.

### O-RING GROOVING TOOLS

O-ring grooving tools produce the precise groove needed for O-rings

—meet the exact specifications of ring manufacturers. 15 different tools are available from stock for single O-rings, or for O-rings requiring one or two back ups.

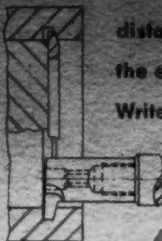
Larger diameters feature 2-piece construction. Write for Catalog O-R.



### RETAINING RING GROOVING TOOLS

A range of 29 tools is available to cut exact grooves for standard or tapered retaining rings, beveled, beveled and self-locking retaining rings. 2-piece construction on larger diameters permits use of any length bar to compensate for the distance of the groove from the end of the work piece.

Write for Catalog R-R.



**BOKUM TOOL CO., Inc.**

14775 WILDEMERE AVENUE  
DETROIT 38, MICHIGAN

# LONG TOOL LIFE— CLEAN OPERATION

**A 5-Year Report on Texaco  
Cleartex Oil at Scintilla  
Division, Bendix Aviation  
Corporation, Sidney, N. Y.**

**SCINTILLA DIVISION**, Bendix Aviation Corporation, uses *Texaco Cleartex Oil* in these automatics as both cutting fluid and machine lubricant. Results over the past five years have been outstandingly successful.

**IN 1950**, a few months after *Texaco Cleartex Oil* went into use on this battery of automatics, the following benefits were noted: 1) drills lasted twice as long; 2) uniform hole size was maintained; 3) staining of copper was eliminated; and 4) lubrication expense was reduced because *Texaco Cleartex Oil* serves as both cutting fluid and machine lubricant.

TODAY, Mr. Ray Beames, Supervisor, has this to report: "These benefits are still continuing. *Texaco Cleartex Oil* has solved many of our cutting problems on

non-ferrous metals and free machining steel. In addition, there has been *no maintenance necessary* on the lubricating sides of the machines."

There is a complete line of *Texaco Cutting, Grinding and Soluble Oils* to help you do all types of machining better, faster and at lower cost. A Texaco Lubrication Engineer specializing in this field will gladly recommend the proper ones for your jobs.

Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, New York.



## TEXACO

**CUTTING, GRINDING,  
SOLUBLE AND  
HYDRAULIC OILS**



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May 1955 Issue

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City \_\_\_\_\_

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Circle key numbers for more information on items described or advertised in this issue.

431 Main Street  
Cincinnati 2, Ohio

**modern  
machine  
shop**

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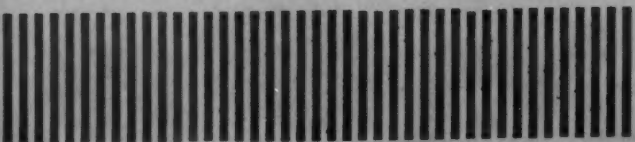
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**NEW YORK 14, NEW YORK**



MAY

1955

Vol. 27

No. 12

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# modern machine shop

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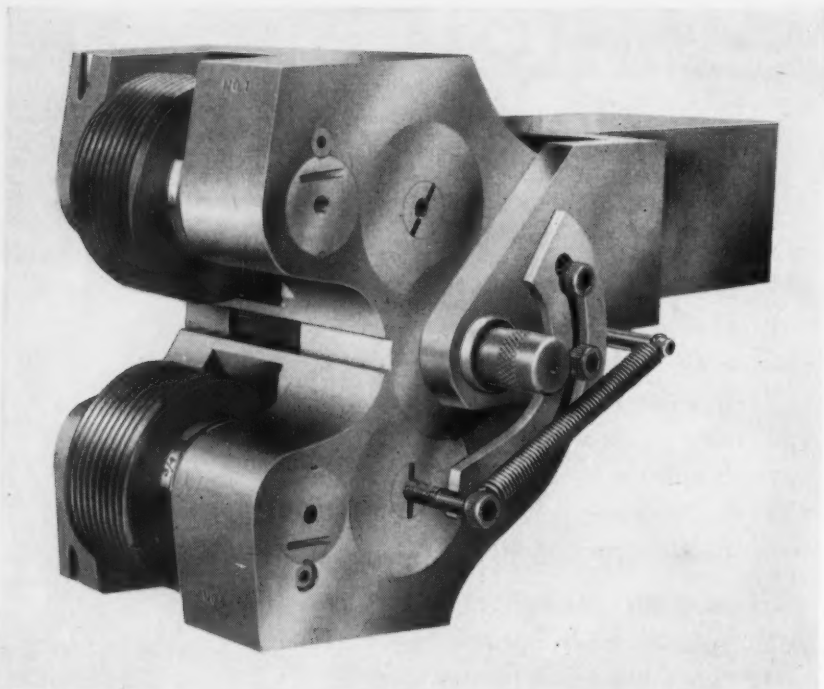
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The LANROLL Thread Rolling Attachments offer features designed to ensure greater accuracy, flexibility and economy when producing threads. . . .

1. **PERFECT HELIX AGREEMENT** allows rolling coarse pitch threads to Class 4 tolerances with long roll life. Threads can also be rolled directly to a shoulder with safety.
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4. **RAPID AND PRECISE SET-UPS** are possible with special gaging methods de-

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5. Five sizes of Attachments roll a wide range of threads:

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 #24— $\frac{3}{4}$ " to  $1\frac{3}{4}$ "

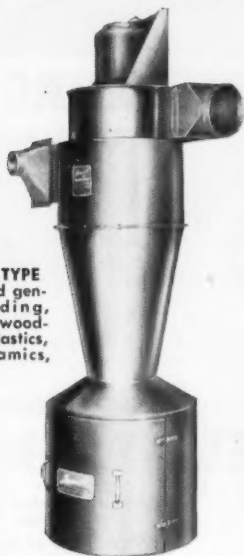
Other outstanding advantages of these LANROLL Attachments include: large diameter rolls for longer roll life; taper correction; and excellent thread finish and microstructure. For additional information ask for Bulletin G-96—please send specifications when writing.

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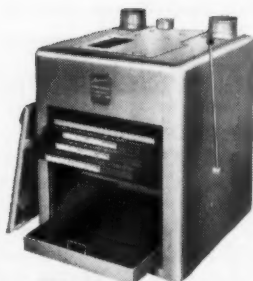
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cutting tool  
IN YOUR PLANT-**



**CYCLONE TYPE**  
for tool and gen-  
eral grinding,  
polishing, wood-  
working, plastics,  
glass, ceramics,  
etc.



**FILTER TYPE**  
for grinders,  
drills, lathes,  
surface grind-  
ers, etc.

No—it's not a tool of production—it's a tool of destruction! . . . it is **ABRASIVE GRIT**—by-product of your grinding, cutting and finishing operations.

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**DUSKOLECTORS**

**A MUST FOR DUST!**

These units trap dangerous dust before it can harm the health and efficiency of your employees and damage valuable machinery . . . These two distinct types of Duskolectors offer the best and most economical solutions to your special dust problems. Hammond experience will help you too, in eliminating the dust menace . . . Write today for bulletin.



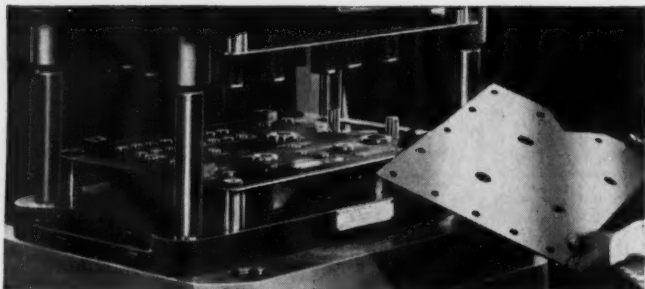
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*Hammond* OF KALAMAZOO GOOD MACHINERY SINCE '22

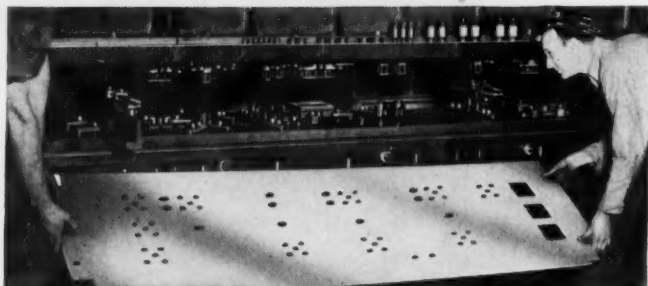
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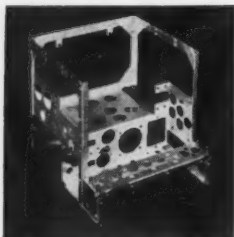
**OVER  
2,000  
PLANTS**  
*are making up  
their Metal  
Perforating Die  
Sets by Whistler  
methods*



## WHISTLER **MAGNETIC PERFORATING** DIES

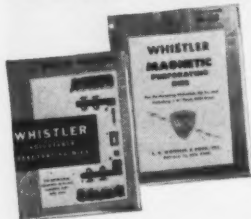


## WHISTLER **ADJUSTABLE PERFORATING** DIES



- Lower die-making costs.
- Start production quicker.
- Save work handling labor.
- Increase press production.
- Versatile in job application.
- Perforate materials to  $\frac{1}{4}$ " thick mild steel.
- Combine horizontal and vertical perforating operations.
- Work in practically any size or type of press.
- All parts re-usable and interchangeable.
- Precision assured on short or long runs.
- Parts interchangeable right in the press.
- Magnetic dies assembled on templates.
- Adjustable dies assembled on Tee slot die sets.
- Save floor and storage space.
- Die investment not "tied up."

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Our *illustrated* Catalogs show the simplicity, economy and versatility of Whistler methods. See for yourself why Whistler customers are the biggest names in industry.

**WHISTLER DIES  
ARE CUTTING  
COSTS FROM  
COAST TO COAST**

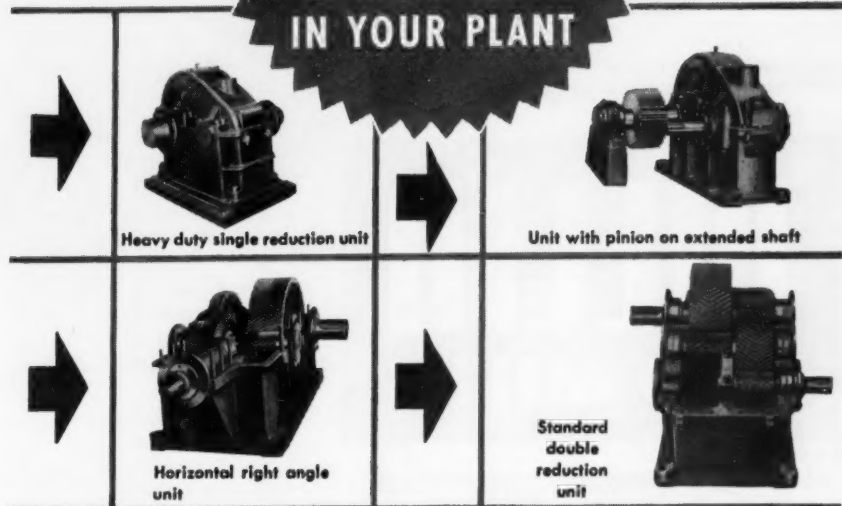
**S. B. WHISTLER & SONS, INC.**

740 Military Road

Buffalo 23, New York

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**THE  
SPEED REDUCER**  
*Most likely to  
Succeed*  
**IN YOUR PLANT**



Farrel speed reducers start out with a better chance in life.

To begin with, the gearing in a Farrel speed reducer has teeth generated by the famous Farrel-Sykes method—a process that assures accuracy of tooth spacing, profile and helix angle. The herringbone design provides evenly distributed pressure over each tooth, from tip to working depth line. This means that there is no

tendency for the teeth to wear unevenly and thus shorten the life of the gears.

The gears and pinions can be proportioned to meet specific load, speed, and service requirements. Input and output shafts can be varied in size, in material and in extension. Housing dimensions can even be changed to meet problems in mounting.

*For more about these adaptable units write for a copy of bulletin 449.*

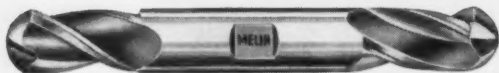
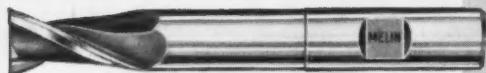
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*Plants: Ansonia and Derby, Conn., Buffalo, N. Y.*

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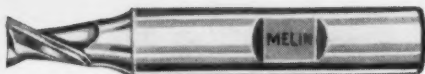
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# MELIN

## END MILLS



*Representatives in principal cities.*



**MELIN TOOL  
COMPANY, INC.**

3373 West 140th Street  
Cleveland 11, Ohio



There is a difference  
in end mills . . .  
**MELIN** end mills!  
Proof of this  
is evident in the  
continued increase  
in **MELIN** popularity.  
The growth in  
**MELIN** tool acceptance  
was by no means an  
accident  
. . . The secret  
is in **CONSISTENT  
QUALITY**. This  
standard of Quality  
assures you better  
performance . . .  
longer lasting  
performance . . .  
**CONTINUOUSLY . . .**  
from one shipment to  
another.  
Next time you order  
end mills . . .  
specify the finest . . .  
specify **MELIN**.

**MANUFACTURED IN  
TWO, THREE AND FOUR  
FLUTE TYPES.**

For more data circle 205 on Reader Service Card



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Longer life, better performance—yes, and *lower costs, too*—should be engineered into the product at the start. For example: when you specify Gisholt SUPERFINISH, you accomplish two things: First, you assure a bearing surface free of the imperfections that cause wear—a surface that will last indefinitely. Second, you cut the cost of grinding—or even eliminate it. Surprisingly enough, you can in most cases achieve this superlative finish at lower over-all cost than is possible with other methods of finishing.

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# GISHOLT

MACHINE COMPANY

Madison 10, Wisconsin



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represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

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Madison 10, Wisconsin  
Gentlemen:

Please send my free copy of "Wear and Surface Finish."

Name.....Title.....

Company.....

Street Address.....

City.....State.....

TURRET LATHES • AUTOMATIC LATHES  
SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

**There's No Catch to this**

*Something*



**CINCINNATI No. 2-24  
DUPLEX AUTOMATIC  
MILLING MACHINE**

Milling two sides simultaneously,  
on cast iron pump parts at the rate  
of 60 per hour, employing the  
index base method of milling on a  
CINCINNATI No. 2-24 Automatic.

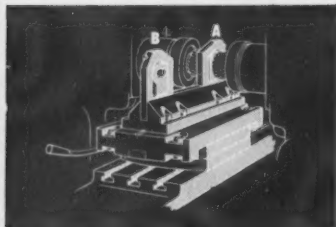
**CINCINNATI  
INDEX BASE**

**CIN**

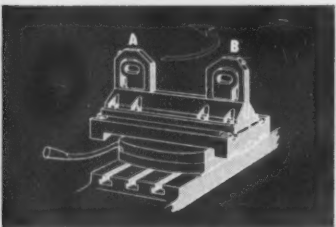
**MILLING MACHINES • CUTTER SHARPENING MACHINES • BROACHING MACHINES • METAL FORMING**



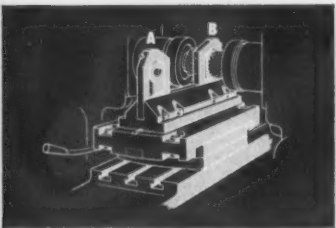
# for Nothing SETUP



Milling the part in fixture A.  
Plenty of time to reload fixture B.



Swiveling the Index Base table  
at end of cycle.



Milling the part in fixture B.  
Plenty of time to reload fixture A.

Cost wise, the all-Cincinnati equipment illustrated here actually does give you something for nothing. The trick is accomplished with a setup that takes advantage of the free time during the feeding stroke of the table. Drawings at the left show how it works. ¶ A CINCINNATI No. 2-24 Duplex Automatic Milling Machine is equipped with a Cincinnati Index Base (standard attachment) for the operation of milling two sides of pump parts. The entire production cycle proceeds along the following pattern: at the completion of the milling cut, the table automatically returns to starting position, the operator indexes the Index Base table 180°, and the cycle automatically repeats. Notice that there's no time allowance for handling the work. This item, usually a considerable cost factor, is free; accomplished while the cutters are at work. ¶ This is a typical example of cost reduction by CINCINNATI No. 2-24 Automatic Milling Machines. They have many features of value in operating at rock-bottom costs:

Cycle selector unit . . . hundreds of variations; changed in a minute or less. Automatic two-way table cycles. Single lever table control. Automatic spindle stop. Automatic backlash eliminator.

You can get the entire No. 2-24 story by writing for catalog M-1760-1, and for the Cincinnati Index Base, ask for M-1448-2.

**THE CINCINNATI MILLING MACHINE CO.**  
**CINCINNATI 9, OHIO**

# CINNATI

MACHINES • FLAME HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID

For more data circle 206 on Reader Service Card

May, 1955

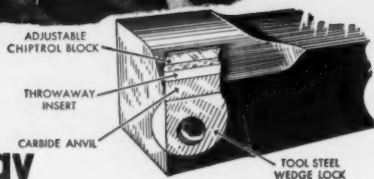
modern machine shop 9

You'll Call It Production Magic

**Viking**  
calls it  
**Chiptrol**



## Chip Control with DEXAMATIC Throwaway Carbide Inserts for single point cutting tools



This new development, by the pioneers of mechanical, adjustable chip control, cuts production time and eliminates expensive grinding. Costs hit a new low when these multiple-edge throwaway carbide inserts are used. Viking inserts speed operations. They lock positively so that no movement is possible under feed pressure. And Viking design provides a carbide anvil under the carbide tip to provide maximum insert support and heat dissipation, to further reduce your costs. Index the insert for each new cutting edge for speedy set ups.

Square and triangular inserts now available in two duty ranges. Styles A, B, F, FB and G. Standard Shank Sizes #12, 16, 20, 24, 54, 64, 85, 86.

Write for Bulletin No. 55

### Viking Chiptrol DEXAMATICS

Offer These Exclusive Features

- Adjustable mechanical chip breaker
- Carbide, replaceable anvil
- Positive or negative rakes
- Lowest cost per cutting edge
- Interchangeable inserts, anvils and chip breakers

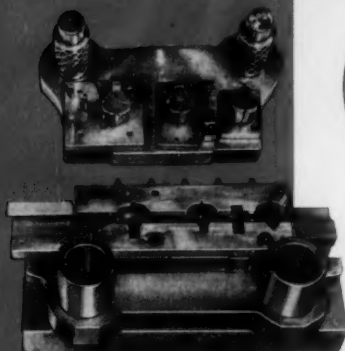


**Do You Have Milling Problems? Consult Viking** NICHOLS ROAD SHELTON, CONN.

For more data circle 209 on Reader Service Card

**Lewyt Corp. says...**

**"for long run dies  
we prefer..."**



# Olympic FM DIE STEEL"

• Olympic FM six-station progressive die with automatic feed—manufactures "damper cages" from .031 electro-galvanized cold rolled steel used in Lewyt Vacuum Cleaners.



Photo courtesy of Lewyt Corp. Model 11, N.Y.

**Lewyt Corporation specifies Olympic FM because...**



"... Olympic FM yields a superior machined finish ... does not tear."

"... Olympic FM machines much easier than other hi carbon-hi chrome steels ... increases tool life."

"... die performance is excellent."

Latrobe's new Olympic FM is a **DESEGATIZED®** High Carbon-High Chromium die steel which has given die makers improved machinability for thousands of long run tools and dies. Improved machinability is made possible through the addi-

tion of alloy sulphides uniformly dispersed by the **DESEGATIZED®** process of manufacture.

For easier machining and long-lived tools and dies, order Olympic FM die steel ... over 230 sizes regularly stocked at 10 convenient warehouse locations.

## Branch Offices and Warehouses:

Boston	Detroit	Philadelphia
Buffalo	Hartford	Pittsburgh
Chicago	Los Angeles	St. Louis
Cleveland	Milwaukee	San Leandro
Dayton	Newark	Toledo

## Sales Agents:

Albuquerque	Denver	Wichita
Charlotte	Houston	Windsor
Dallas		

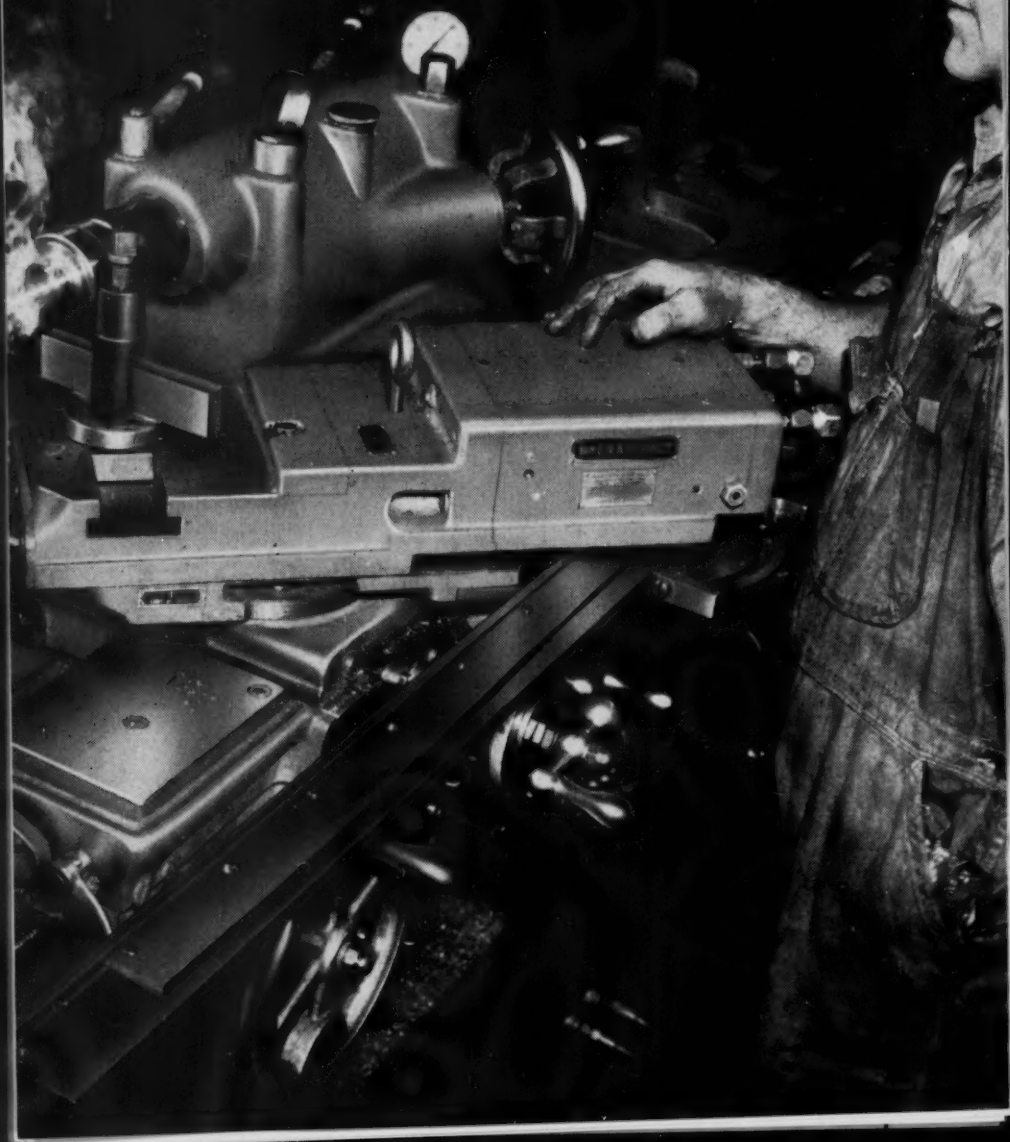
## European Offices:

Brussels	Madrid	Rotterdam
Düsseldorf	Milan	Vienna
Geneva	Paris	

# LATROBE STEEL COMPANY

MAIN OFFICE AND PLANT  
LATROBE, PENNSYLVANIA

**SAVE TIME IN TRACING,**



# TURNING, FACING

with **Hydra-Trace**\* and your **LeBlond** lathe!

Check the job list of most any LeBlond Lathe—Hydra-Trace combination. You'll find it turning complex dies in the morning, step shafts in the afternoon. Yesterday, it was contour facing compressor discs; tomorrow, turning bevel gear blanks. And saving time on every one!

Hydra-Trace can be mounted in place of the compound rest on most any LeBlond Lathe . . . in minutes. It swivels to the most favorable angle for proper tool clearance. Its flat template is easily made, conveniently stored. Template holder and all controls are neatly located at front of lathe. And you can remove Hydra-Trace to use your lathe for other work in practically no time at all!

For complete data on Hydra-Trace, ask for Bulletin HT-2A

## American Brass saves 91% of a 6-hour job!

Turning mandrels shaped like baseball bats (used in drawing seamless tubing) ate up 6 hours of lathe and operator time at The American Brass Co., Waterbury, Conn. With Hydra-Trace installed on their LeBlond 16" x 78" HD lathe, it's done in 30 minutes! And the same lathe, with Hydra-Trace removed, is still available for regular turning, facing and chasing!

If variety is important in your lathe operations, you can't do better than Hydra-Trace and a LeBlond lathe. We'll tell you promptly whether Hydra-Trace will fit the LeBlond you have. Or we can recommend *exactly* the right combination for your requirements from scores of lathe sizes and models. See your LeBlond Distributor or write Cincinnati today.

THE R. K. LEBLOND MACHINE TOOL CO., CINCINNATI 8, OHIO

\*Hydra-Trace (Trade Mark registered U. S. Pat. Off.) is LeBlond's heavy-duty hydraulic tracing attachment. Can be mounted in place of compound rest on practically all LeBlond lathes built since 1935.

... cut with confidence



Be sure to see LeBlond, Booth 1313

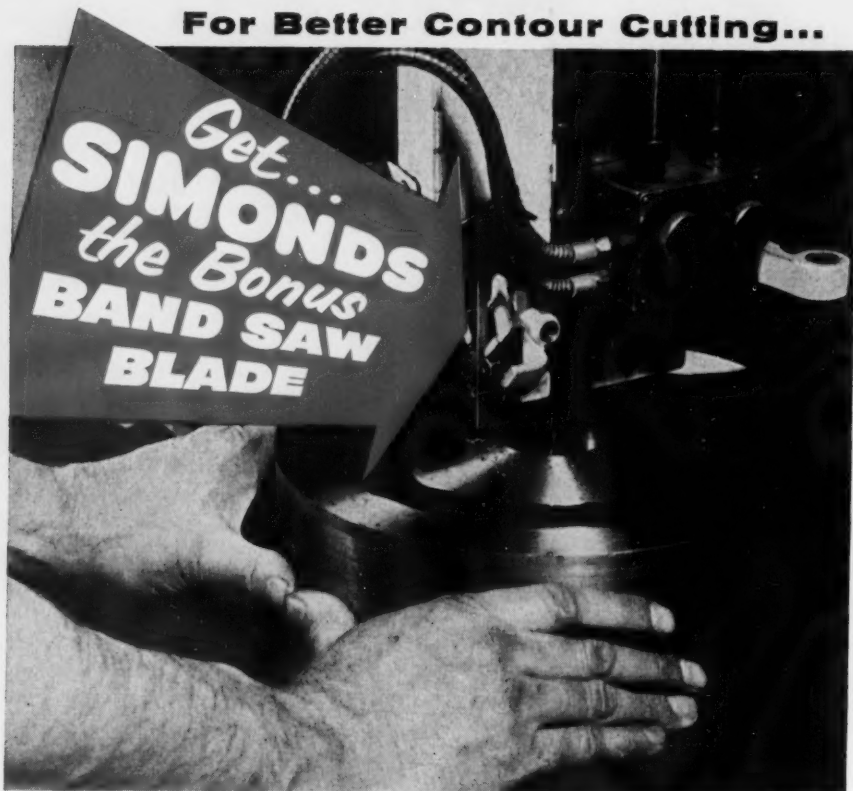


World's Largest Builder of a Complete Line of Lathes • For More than 68 Years

For more data circle 212 on Reader Service Card



**For Better Contour Cutting...**



**gives you more cuts, longer life, lower costs!**

Here's a tough, edge-holding metal cutting band saw blade that gives you a real bonus in smooth, fast cutting and long life.

Made of extra tough, wear-resistant alloy steel, Simonds "Bonus" Bands have sharp, perfectly formed teeth — set with absolute evenness on both sides of the blade. Hardened along the tooth edge only by controlled heat treatment, they combine maximum cut-ability with flexibility and resistance

to breakage, provide the ultimate in trouble-free service.

All standard widths and tooth spacings are furnished in 100' and 250' coils or welded to specified length. Ask your local Simonds Industrial Supply Distributor for more information on the complete line of Simonds "Bonus" Band Saws.

**For Fast Service  
from  
Complete Stocks**



Call your  
**SIMONDS  
Industrial Supply  
DISTRIBUTOR**



Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon  
Canadian Factory in Montreal, Que. Simonds Divisions: Simonds Steel Mill, Lockport, N. Y.  
Simonds Abrasive Co., Phila., Pa., and Arrida, Que., Canada

For more data circle 213 on Reader Service Card

***You too...***

*will benefit  
by using*

## **ATrax CARBIDE TOOLS**



Thousands of users everywhere continue to specify ATRAX Precision Ground-from-the-Solid Carbide Tools.

Whether your needs are for Carbide Burs, Drills, Reamers, Tool Bits, End Mills, Special Cutters—either Stock Items or Specials—you'll be amazed at the superior cutting edges, longer life, better production results with ATRAX.

*It's New! Complete 88-page catalog of ATRAX Carbide Tools, includes selection tables and recommended applications. Write today for your copy.*



**THE ATRAX COMPANY**  
NEWINGTON 11, CONNECTICUT

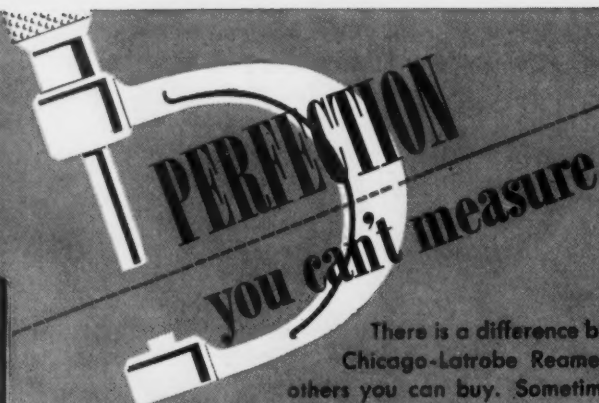
**Specify ATRAX Precision Ground-from-the-Solid Carbide Tools**

ATrax Representatives and Distributors are located in principal cities throughout United States and Canada. Write us for our Representative's name in your area.

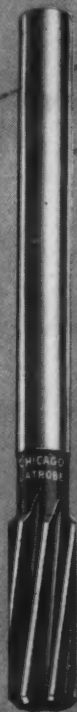
For more data circle 214 on Reader Service Card

May, 1955

modern machine shop 15



There is a difference between Chicago-Latrobe Reamers and others you can buy. Sometimes you can't see this difference—or even measure it with a micrometer. But when you put these tools to work on your production jobs, their finer qualities become something you can measure in the dollars and cents of extra production. Finer, basic materials and finer treatment of these materials form the basis of this extra performance. And beyond this is an unmatched experience in fine tool-making. When you try them you'll see the difference.



## CHICAGO-LATROBE

HIGH SPEED  
and CARBIDE

## REAMERS

### SERVICE THAT'S DOUBLE-BARRELLED

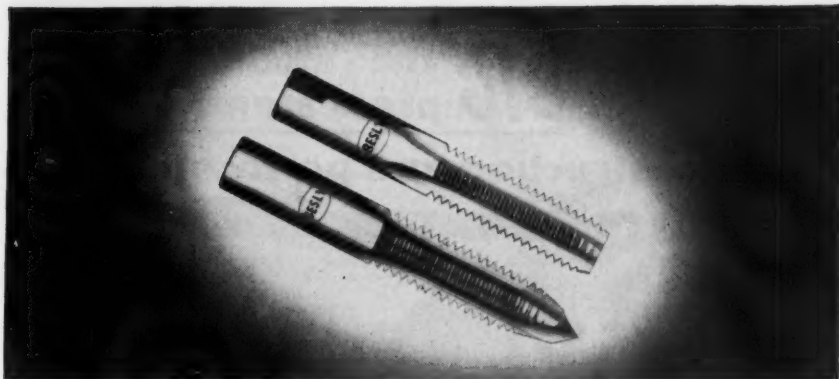
Chicago-Latrobe service means two things to you: 1. Dependable, on-time delivery from the most complete line of cutting tools, and, 2. Skilled help on tough problems from your Distributor and Chicago-Latrobe's own Service Engineers.



# Chicago-Latrobe

419 W. ONTARIO STREET • CHICAGO 10

- DRILLS • COUNTERSINKS
- CARBIDE TOOLS
- REAMERS
- COUNTERBORES
- SPECIAL TOOLS



## New Besly Stub Tap for Screw Machines

*Saves Set-up Time, Fits Standard Bushings, Has Stronger Shank  
Available at No Extra Cost from BESLY*

A new, shorter length tap that eliminates the need to make alterations before using it in screw machines has just been developed by Besly in cooperation with the National Screw Machine Products Association.

### **SHORTER SHANK, SHORTER THREADED PORTION**

The shank (and threaded portions in larger sizes) of the new Stub Tap have been shortened to enable it to fit into the space between the spindle nose and tool holder of screw machines. In the past, it has been necessary for users to cut off part of the shank and even part of the threaded portion of standard hand taps to fit them into screw machines . . . or order higher priced "specials."

### **SIMPLIFIES BUSHING INVENTORY**

The shank of a Stub Tap is the same size as its nominal O.D. This permits standard sized bushings to be used and reduces bushing inventory problems. The full dia-

meter shank provides greater strength than standard hand taps which have shanks usually turned down in the larger sizes.

### **FACTORY-PERFECT ACCURACY**

The shank of the Stub Tap is made concentric with the threaded portion, assuring accurate alignment in the tool holder. Since it is not necessary to cut off the forward threaded portion of a Stub Tap, chamfer and back taper are maintained factory-perfect. Squares, except for two small driver flats at the end of the Stub Tap, are eliminated. This permits better holding power, better alignment and longer accuracy.

### **AVAILABLE IN SIZES THROUGH 1-IN.**

The new Stub Tap is available at no extra cost from Besly distributors. It is made in fractional sizes from 1/4-in. through 1-in. and in machine screw sizes from No. 0 through No. 14. See your Besly distributor or write for the sizes you need for delivery June 1.



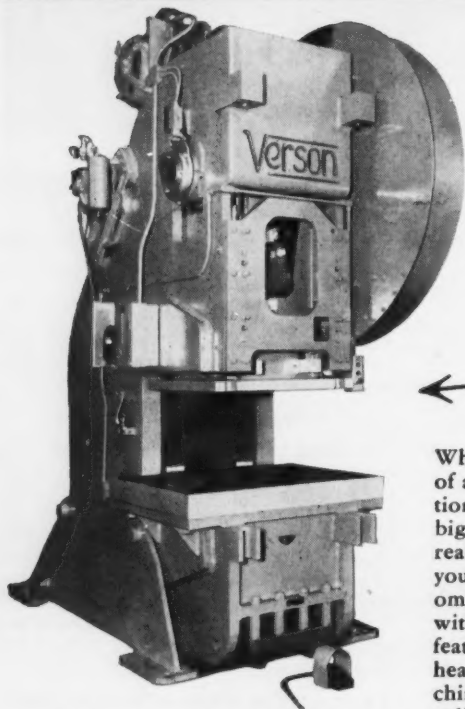
**BESLY-WELLES**  
CORPORATION  
108 Dearborn Avenue, Beloit, Wis.

Established as Charles H. Besly  
and Company in 1875

BESLY Taps, Drills, Tool Bits, Reamers and  
End Mills . . .

For more data circle 216 on Reader Service Card

You get **BIG** press standards  
of construction and performance



Write for your copy of the new  
Verson Open Back Press Catalog.  
It's just off the press.

in



**O. B. I.'s**

When you can combine the versatility of an O.B.I. press with the construction and performance standards of big, expensive machines, you get a real production tool that will give you the best possible long term economy . . . And that's just what you get with Verson O.B.I.'s. Just check these features—gears running in oil . . . heavy all-steel welded frame . . . machine cut steel gear and pinion . . . split cap main and crankpin bearings . . . mechanically interlocked pneumatic clutch and brake unit . . . full electric controls . . . many others.



ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

**VERSON ALLSTEEL PRESS CO.**

9310 S. Kenwood Avenue, Chicago 19, Illinois  
So. Lamar at Ledbetter Drive, Dallas, Texas

MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES • TRANSMAT PRESSES  
TOOLING • DIE CUSHIONS • Verson-WHEELON HYDRAULIC PRESSES

For more data circle 217 on Reader Service Card

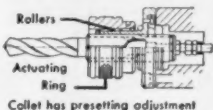


**SCULLY  
JONES**

## "Precision Holding" Tools reduce costs by saving time and eliminating errors at the spindle!

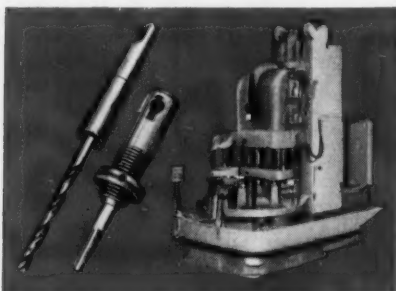
### "Roll-Lock" Chucks add accuracy and dependability to reaming operations!

This Greenlee Transfer Unit is equipped with sixteen Scully-Jones "Roll-Lock" Tool Chucks, which provide a completely different and advanced method for holding and driving reamers. Operator merely twists the actuating ring to produce an accurate, centering *shrink fit* on shank of reamer. There's no clearance or play ... positive, rigid holding permits high production of *straight, round holes*. "Roll-Locks" give you accuracy within "tenths" for both production and toolroom operations. Write or wire for Bulletin No. 17-50.



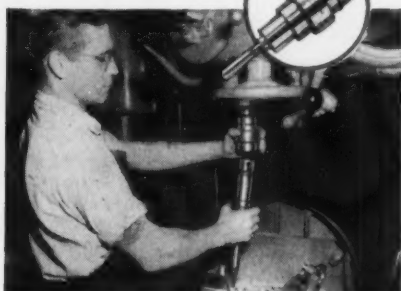
### Adjustable Adapters and Drill Chucks speed tool changes, increase accuracy!

Michigan Drill Head Company equips its machine spindles with exclusive features found only in these improved Scully-Jones Tools. Quick-Lock Adjustable Adapters, with new "keyhole" drift slot, eliminate damage often caused by hammering on conventional drifts ... make tool changes faster and easier. Scully-Jones Drill Chucks, with improved four-slot design, provide improved seating and collet action, plus greater resistance to pull out.



### Quick-Change Chucks speed sequence operations on radial drill!

This radial drill at Caterpillar Tractor Company does sequence operations with multiple-spindle efficiency because Scully-Jones Quick-Change Chucks make tool changes fast and easy! Operator just lifts locking ring without stopping the machine to release or insert the collet chuck and tool. Use them with other Scully-Jones tools to speed production, increase accuracy, and reduce operator fatigue on drilling, reaming, and tapping jobs. Write for Bulletin 3-50.



SCULLY-JONES AND COMPANY, 1909 S. ROCKWELL ST., CHICAGO 8, ILL.

# SCULLY-JONES

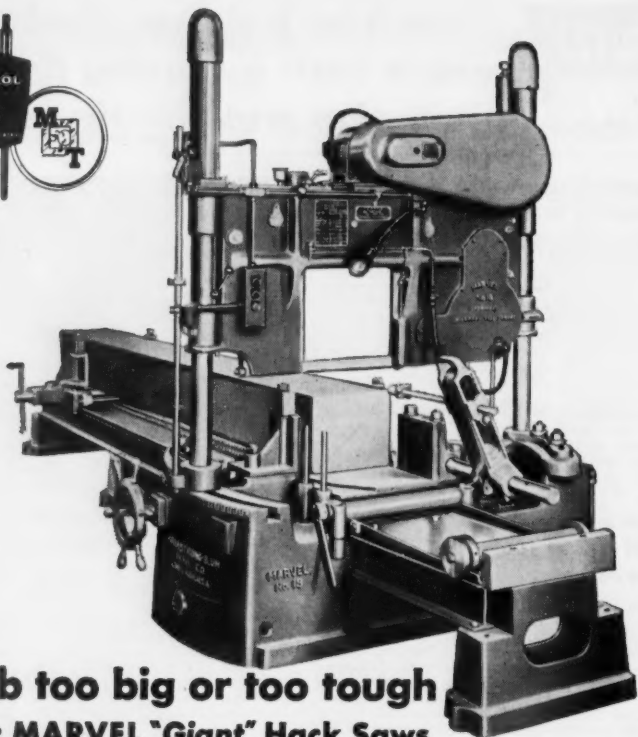
## "Precision Holding" for holding precision

Call your Scully-Jones representative or distributor—factory-trained "Precision Tool and Work Holding Specialist"—for information and service.

For more data circle 218 on Reader Service Card

May, 1955

modern machine shop 19



## No Job too big or too tough ... for MARVEL "Giant" Hack Saws

These giant MARVEL Hydraulic Hack Saws (No. 18, Capacity 18" x 18"; and No. 24, Capacity 24" x 24") were *basically* designed for rapid and economical cut-off of BIG WORK. They are not merely "conventional" designs "stretched" to big capacity. They are truly designed and built with the ruggedness and rigidity necessary to withstand the rough treatment of sawing big work, even though the work is in the "toughest of the tough" alloys.

They are reliably fulfilling the cut-off requirements in innumerable steel mills, forge shops, structural shops, warehouses, and machine shops, with assured low tool cost and minimum kerf loss of steel.

In addition to cutting-off, they are reducing costs by eliminating further ma-

chining operations. Heat treated die blocks are being reclaimed for re-sinking by sawing off the worn face; columns, beams, pipe, and tubing are being sawed to *finished*, square ends eliminating milling; angular sawing is done conveniently by swinging the upper structure on the base, to any angle up to 45 degrees—*without moving the work*.

Contemplating the modern trend toward ever tougher steels and larger sizes, these are the logical sawing machines to buy, not only for today's needs but for tomorrow's as well.

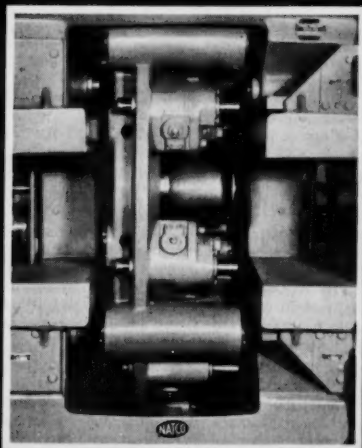
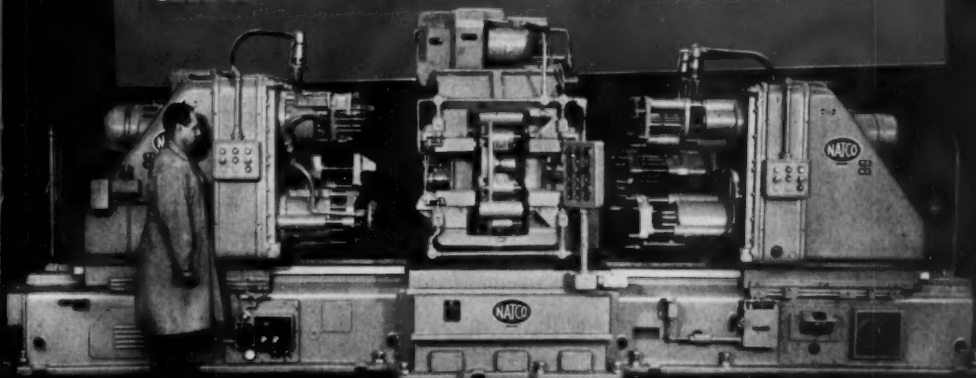
Write for Catalog



**ARMSTRONG-BLUM MFG. CO. 5700 W. Bloomingdale Ave., CHICAGO 39, U.S.A.**

For more data circle 219 on Reader Service Card

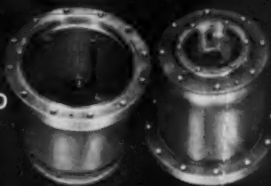
# COMBINING OPERATIONS on a NATCO Cut Costs and Increased Production!



Close-up view of 6 position Trunnion Fixture

**109** REFRIGERATOR  
COMPRESSOR  
SHELLS PER HOUR  
*Estimated Gross Production*

DRILLED  
COUNTERBORED  
REAMED, TAPPED  
CHAMFERED  
BURRED



Total . . . . . 77 OPERATIONS

**NATIONAL AUTOMATIC TOOL COMPANY, INC.**  
RICHMOND, INDIANA

for problems in Drilling, Boring, Facing and Tapping

*Call a Natco Field Engineer*

CHICAGO, Room 203, 6429 W. North Ave., Oak Park  
DETROIT, 10138 W. McNichols Rd.  
BUFFALO, 1807 Elmwood Ave.  
NEW YORK, 35 Beechwood Ave., Mount Vernon



# New MORRIS

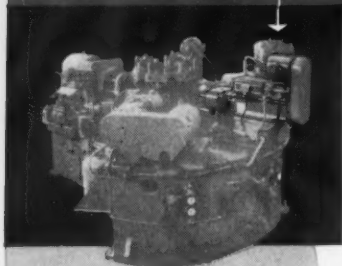
## AIR·OIL· MATIC

### DRILL UNITS



Unit Type Six-Station automatic indexing machine for drilling, tapping and facing a master brake cylinder. The Air-Oil-Matic unit shown drills two .026" diameter holes at 10,000 R.P.M. in cast iron.

air power •  
hydraulic control  
or all-hydraulic  
models



**perfected to give exceptional versatility  
for higher production at lowest cost**

Here's the automatic drilling unit you've been looking for! The Morris AIR-OIL-MATIC Drill Unit is a powerful package of precise versatility developed and perfected by one of the nation's leading manufacturers of high production drilling machinery. Now, this compact unit (air or oil powered and hydraulically controlled) is available for your use in special purpose machines.

Designed for a wide range of drilling, reaming, chamfering, spot facing, hollow milling, centering and related operations, it can be mounted in vertical, angular or horizontal positions. The Morris AIR-OIL-MATIC Drill Unit has adjustable feed rate, feed stroke, total stroke. Controls and actuating devices can be set to provide almost any desired sequence of operations. (see condensed specifications)

If you have mass production operations involving drilling or related operations . . . you'll want to know all about the Morris AIR-OIL-MATIC Drill Unit. New literature describing the unit, its advantages and applications and complete with specifications, is available on request.

#### CONDENSED SPECIFICATIONS

Length, width, height	33 1/4" x 11" x 23"
Maximum HP at 1800 rpm	2 HP
Spindle speeds	133-6900 (Standard) (Special speeds on request)
App. maximum thrust	650 lb.
Maximum drill size	1 1/2"
Maximum stroke	6"
Maximum feed stroke	4 1/2"
Feed rate range	0 to 48"/min.
Quick approach rate	480"/min.
Quick return rate	300"/min.

*Morris* MACHINE TOOL COMPANY  
934 HARRIET ST., CINCINNATI 3, OHIO

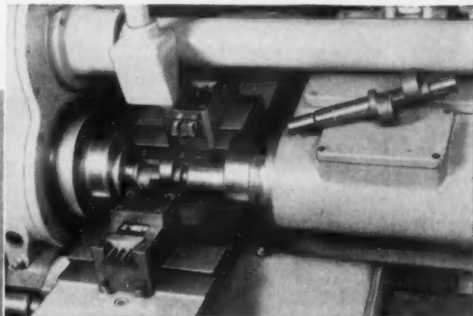
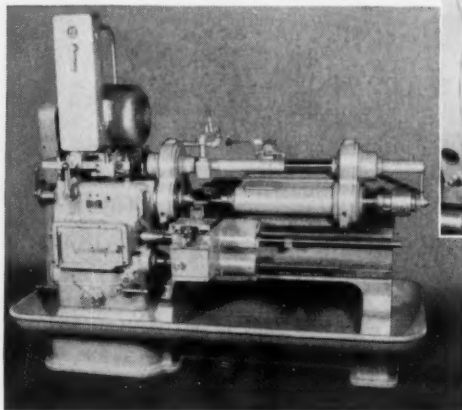


For more data circle 221 on Reader Service Card

# MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK

Model LR Lo-swing Automatic Lathe equipped with double-end drive for machining eccentrics.

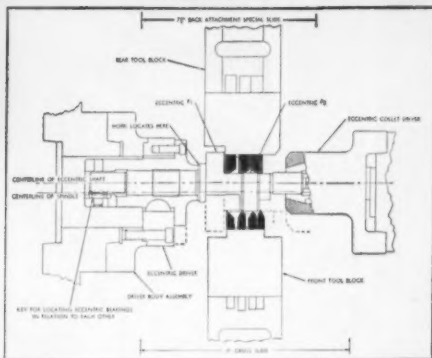


## DOUBLE END DRIVE Lo-swing LATHE MACHINES ECCENTRICS AT A FAST PACE

**PROBLEM:** To accurately machine eccentric bearings on compressor shafts within close tolerances.

**SOLUTION:** The Model LR Automatic Lo-swing Lathe selected for this operation was equipped with a double-end drive to prevent twisting or distortion of the shaft due to tool cutting pressures. The drive to the tailstock is taken from the headstock spindle and transmitted to the tailstock spindle by means of an overhead drive shaft. Special gearing eliminates all backlash.

The work is held and driven with offset drivers mounted on both the headstock and tailstock spindle noses as shown in the line drawing. The drive from the headstock end is through a key which positions the



shaft in relation to either No. 1 or No. 2 eccentrics. The drive from the tailstock spindle is by means of an air-operated collet driver. Loading and unloading of parts is facilitated by an air-operated tailstock which retracts 6-1/2" by a simple movement of an air control valve.

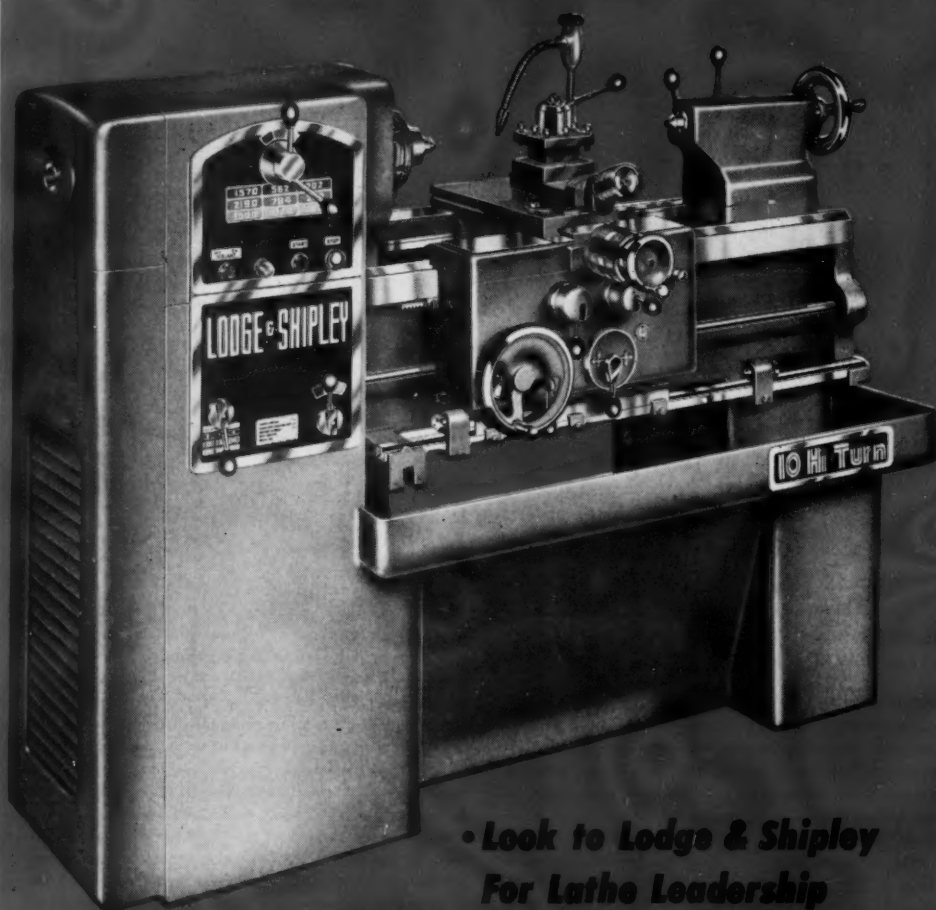
The tooling used for this job is shown on both the line drawing and the close-up view of the operating area of the machine. The front tool block has four tools for turning the eccentric and the clearance diameters adjacent to the eccentric. The back squaring attachment carries three tools, one for facing the side of No. 1 eccentric and the other two for chamfering the edges of No. 2 eccentric.

SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.

PRODUCTION COSTS ARE LOWER WITH Lo-swing

**NEW**

**LODGE & SHIPLEY 10<sup>1/2</sup>"**



**• Look to Lodge & Shipley  
For Lathe Leadership**

\*Above price is F.O.B. CINCINNATI, OHIO  
and is exclusive of applicable taxes cus-  
tomarily paid by the buyer.

**SEE IT NOW! and SEE IT AT THE MACHINE TOOL SHOW, SEPTEMBER 6-17**



# HI-TURN LATHE

## A SMALL LATHE with FAMOUS LODGE & SHIPLEY QUALITY and ACCURACY

FULL 5 H. P.  
3000 R. P. M.  
HEAVY DUTY  
GEARED HEAD

only  
**\$4,985\***

Including electrical  
equipment, ammeter,  
direct reading cross  
feed dial, dial for  
apron handwheel,  
pen, pump and tub-  
ing, and other items.

The Lodge & Shipley 10" HI-TURN Lathe is a completely new concept in lathes . . . new in size, design, utility and even in price. It provides high speed turning, boring and facing capacity for production departments, where the use of a leadscrew is of no consequence.

Over a period of years, Lodge & Shipley research established the fact that lathes used on a production basis rarely require leadscrews. Lodge & Shipley has eliminated the leadscrew and its complicated gearing. The result is a rugged lathe of high efficiency and productive capacity at a price substantially lower than conventional lathes.

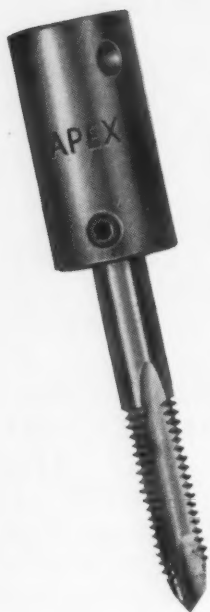
Put the money-making 10" HI-TURN to work in your plant now! Write for Bulletin 300, The Lodge & Shipley Co., 3055 Colerain Avenue, Cincinnati 25, Ohio.

### NEVER BEFORE...SO MANY FEATURES... SO MUCH QUALITY AT SUCH LOW COST!

- ★ Nine color-coded speeds up to 3000 RPM and 5 HP
- ★ Totally-enclosed quick change gear box
- ★ Dynamically braked motor in leg
- ★ Template type length stops, magnetic clutch-operated
- ★ Flame-hardened replaceable steel bedways
- ★ Hardened and ground cross slide ways
- ★ Direct reading cross feed and top slide dials
- ★ Provision for rear tool block . . . multiple tools.

**Lodge & Shipley**  
*your LODGE-ical choice*

# another APEX time-saver!



combination  
SOCKET-TAP  
for re-tapping  
and cleaning  
tapped holes



A damaged or clogged tapped hole can snarl up an assembly line in a hurry—but this Apex combination socket-tap will get things moving again, even faster!

When the assembly line operator encounters a tapped hole which has been damaged or clogged with paint, gook or similar material, he merely uses an Apex socket-tap to quickly re-tap or clean the hole.

Standard socket-taps, with male hex drive, permit instant change from routine power tool operations to re-tapping or cleaning work. Tap sizes:  $\frac{1}{4}$ " to 1". Standard socket-taps, with female square drive, are recommended where separate power tool is available for re-tapping or cleaning. Tap sizes:  $\frac{1}{4}$ " to  $1\frac{1}{2}$ ". Pipe taps, with female square drive, in tap sizes from  $\frac{1}{8}$ " Pipe FS to  $1\frac{1}{2}$ " Pipe.

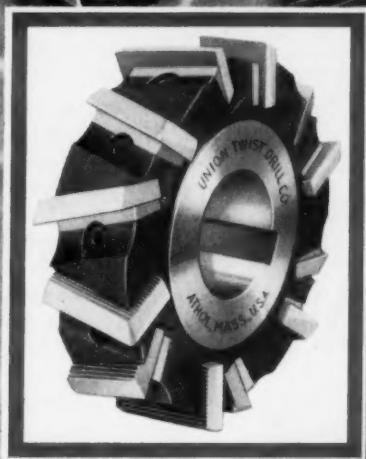
These and many other Apex production tools are described in Catalog 115; write, on your company letterhead please, for your copy.

## APEX

## production tools

THE APEX MACHINE & TOOL CO.  
1027 Patterson Blvd. • Dayton 2, Ohio

For more data circle 225 on Reader Service Card



IN THE METAL WORKING  
INDUSTRY, IT'S

# UNION



**UNION DISTRIBUTORS  
SERVE THE NATION**

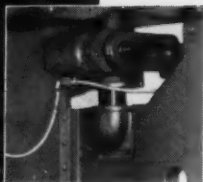
FOR • SPEED  
• ECONOMY  
• RELIABILITY  
• PERSONAL CONTACT

**CALL YOUR UNION DISTRIBUTOR**

**UNION TWIST DRILL COMPANY • ATHOL, MASSACHUSETTS**


OWNERS AND OPERATORS OF: S. W. CARD MANUFACTURING CO. DIVISION, Mansfield, Mass.  
BUTTERFIELD DIVISION, Derby Line, Vermont and Rock Island, Quebec

another  
**Lodge & Shipley**  
press brake feature



### motor-operated micrometer ram adjustment

A separate motor with micrometer control drives both ram and adjustment screws. Direct reading indicators on each screw show vertical adjustment in thousandths. The range is 5"; out-of-parallel maximum adjustment is 2".

  
**Touch a Button  
for Accurate  
Ram Adjustment**

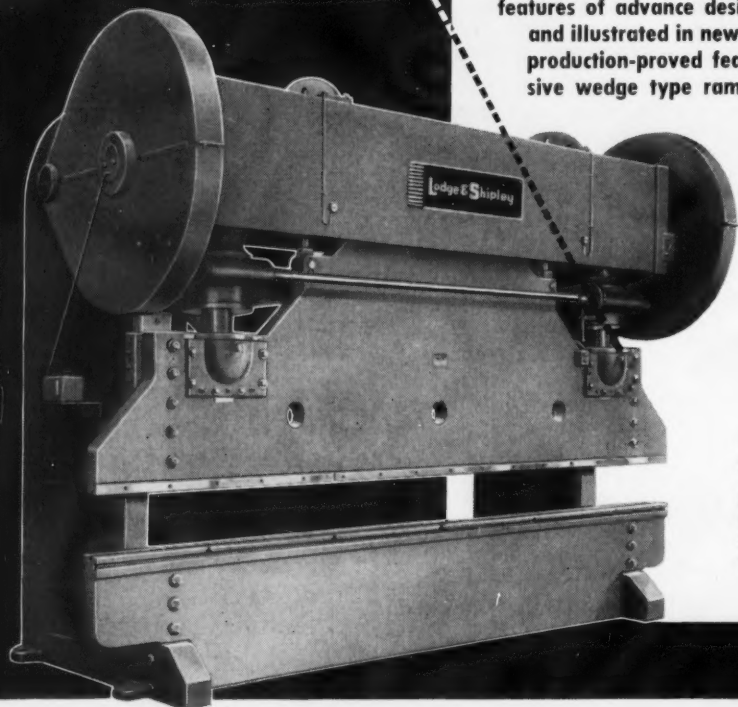
Even the smaller Lodge & Shipley Press Brakes illustrate a fine balance of ruggedness and efficiency which make for dependable, low-cost operation.

An outstanding feature for easy, accurate set-up and adjustment is the Motor-Operated Micrometer Ram Adjustment. At the touch of a button, either or both connecting screw nuts are rotated, adjusting ram position or parallelism with micrometer accuracy.

Lodge & Shipley time, labor and money-saving features of advance design are fully described and illustrated in new literature. Check these production-proved features, including exclusive wedge type ram pressure release and specially designed air clutch and brake, against any other power press brake.

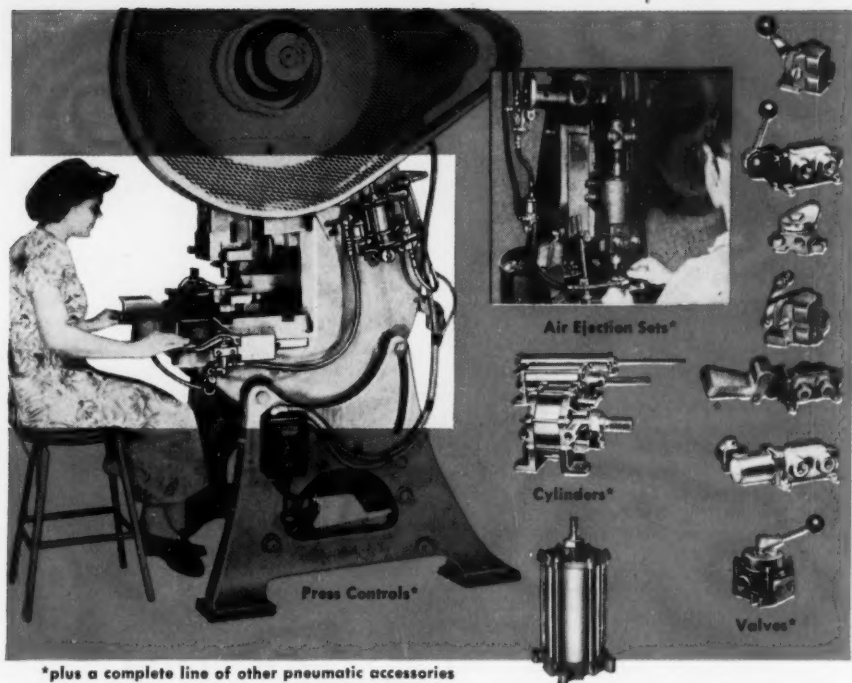
Get the complete story on exclusive Lodge & Shipley press brake features. Write for new FREE Bulletin No. PB-2 and the name of your nearest distributor.

Lodge & Shipley Power  
Press Brake  
Series 350  
20' x 1/4" to 8' x 5/8" cap.



THE **Lodge & Shipley**  
COMPANY

HAMILTON DIVISION  
HAMILTON 11, OHIO



\*plus a complete line of other pneumatic accessories

## Harness air power with Schrader Air Control

On many machines, Schrader Control Sets will actually double your production by replacing time-wasting manual operations with swift, sure movement by air. Schrader Valves, Cylinders and other Air Line Accessories can also lift . . . lower . . . pull . . . push . . .

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Look around your plant. See where air power could do the job better. Then let us help you develop your ideas into efficient air line hookups that will pay for themselves over and over again the first year. For specific information, please write.



The complete Schrader line of pneumatic accessories includes everything you need

LEADERS IN AIR CONTROL SINCE 1844

A. Schrader's Son  
Div. of Scovill Manufacturing Company, Incorporated  
461 Vanderbilt Avenue, Brooklyn 38, N. Y., Dept. J-5

I am interested in more information on \_\_\_\_\_

Name \_\_\_\_\_ Title \_\_\_\_\_

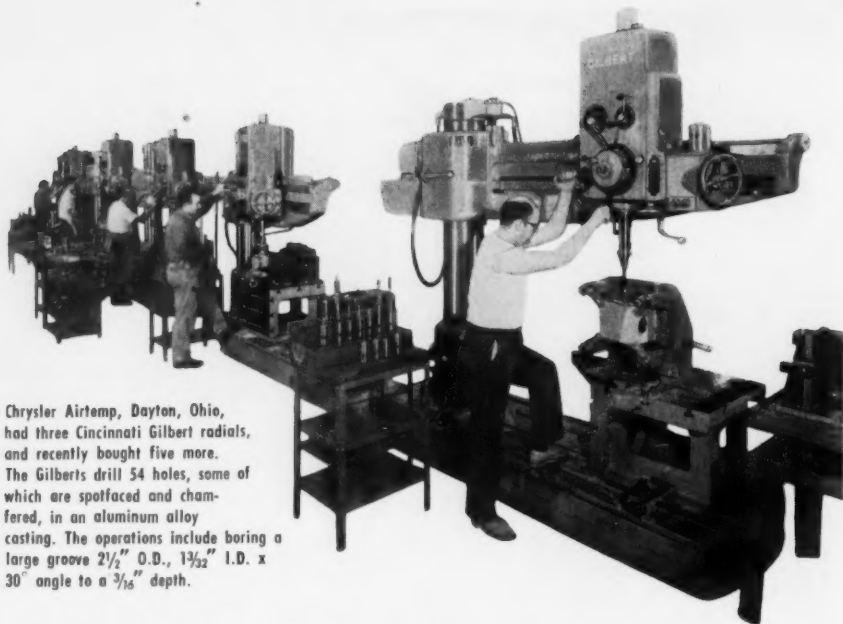
Company \_\_\_\_\_

Address \_\_\_\_\_

For more data circle 228 on Reader Service Card

May, 1955

modern machine shop 29



Chrysler Airtemp, Dayton, Ohio, had three Cincinnati Gilbert radials, and recently bought five more. The Gilberts drill 54 holes, some of which are spotfaced and chamfered, in an aluminum alloy casting. The operations include boring a large groove  $2\frac{1}{2}$ " O.D.,  $1\frac{1}{32}$ " I.D. x  $30^\circ$  angle to a  $\frac{3}{16}$ " depth.

## They bought five more...

because Gilberts produce more. Ease of operation explains in part why Gilbert radials produce more in so many plants. For example, all speed and feed controls are on the head, within easy reach of the operator even when the arm is in its highest position. Direct reading speed and feed plates eliminate time-consuming calculations. You get instant finger-tip shifting of speed and feed levers. The four-lever feed turnstile puts one lever always within handy reach. Other easy-operating features: finger-tip clamping of the head to the arm; instantaneous one-lever arm con-

trol (unclamps, raises, or lowers the arm in one easy motion); effortless head traversing due to balanced, ball-bearing mounting; adjustable electric light at the spindle.

Gilbert radials have 9 or 11-inch columns; 12 spindle speeds in each of 3 ranges; 6 power feeds, .003" to .020". Tap leads are available. *Delivery in 30 days or less.* As the Chrysler Airtemp story shows, "those who buy Gilbert buy Gilbert again." Get full data on the Gilbert's many advantages.

Write for Bulletin 349 today. ▼

# GILBERT

RADIALS • BORING MILLS • ACCESSORIES

THE CINCINNATI GILBERT MACHINE TOOL CO., 3366 BEEKMAN ST. • CINCINNATI 23, OHIO

For more data circle 229 on Reader Service Card

30 modern machine shop



May, 1955



# WADELL "MICRO-FORMED" END MILLS



## FAR AHEAD IN EVERY WAY

Wadell Tools' recent entrance into the End Mill field affords Wadell the great advantage of utilizing the most modern equipment and techniques available. This advantage plus invested elements adds up to superior "MICRO-FORMED" End Mills.

### GROUND FROM THE SOLID

Wadell Tools' End Mills are ground from the solid on the Wadell "Micro-Formatic" Grinding Machines. The development of these machines were the result of a program requiring years of research. The invented principle used, provides means to produce ground from the solid end mills having a cross sectional steel grain structure of perfect uniformity.

### ADVANCED HEAT TREATING

The Wadell factory represents a concentrated effort dedicated to the single purpose of producing premium quality end mills. Consequently, such an operation has the advantage of directing the most advanced heat treating equipment and extreme accuracy of modern electronic controls.

### SUPERIOR UNIFORMITY

Visual examination will immediately convince the experienced tool man that a "Micro-Formed" End Mill represents perfection in such cutting tools. Each given style cutter is an exact duplicate of another. The surface finish produced on the end mills measures in the lowest range of micro finish. Flute spacing is accurate to a tenth of a thousandth of an inch; the flank and relief retains its exact form for the entire cutting length of the flute.

### EXCLUSIVE "MICRO-FORMED" DESIGN

All sections of each End Mill, such as the curve of the flank, shape of the flute, width and depth of the throat have been perfected by painstaking effort. The mills are machine ground and retain the same amount of accuracy and uniformity as the flutes; the end grind is a radial relief.



## WADELL TOOLS

P. O. BOX 97 • RARITAN, N. J.

EXCLUSIVE TERRITORIES AVAILABLE TO STOCKING DISTRIBUTORS

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*You* and the world's industries  
rely on...



## **HYPREZ** DIAMOND COMPOUNDS

For all finishing jobs—from rough to mirror polish.



HYPREZ, the original Diamond Compound, is available in types and grades for every finishing requirement; in 18- and 5-gram sealed cartridges for use with the Hyprez Applicator Gun.

Hyprez Diamond Compounds—a true invention, unique in composition . . .

- Are used in 19 foreign countries, in addition to the United States and Canada.
- Are patented in Switzerland, Sweden, Great Britain, and France.
- Are manufactured under exclusive license in Great Britain, Switzerland, and France.

This worldwide acceptance—the result of 15 years of research and rigid quality control—is guarantee that Hyprez will do your finishing job best.

**HYPREZ DIVISION**  
**ENGIS EQUIPMENT COMPANY**  
431 SOUTH DEARBORN ST. • CHICAGO 5, ILL.

### **LICENSEES**

Engis Ltd., 25 Victoria Street, London SW-1, England

Durox S. R., 80 Rue St. Jean, Geneva, Switzerland

Laminor S.A., Annecy, France

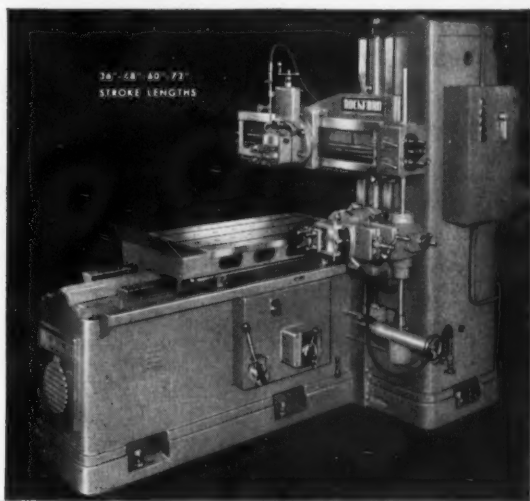
# HYDRAULIC

fast, economical production calls for

# HYDRAULIC

hydraulic openside shapers

# HYDRAULIC



Hydraulic Drive is a natural for reciprocating-type machine tools. It provides smooth, powerful cutting, fewer moving parts, and longer useful life.

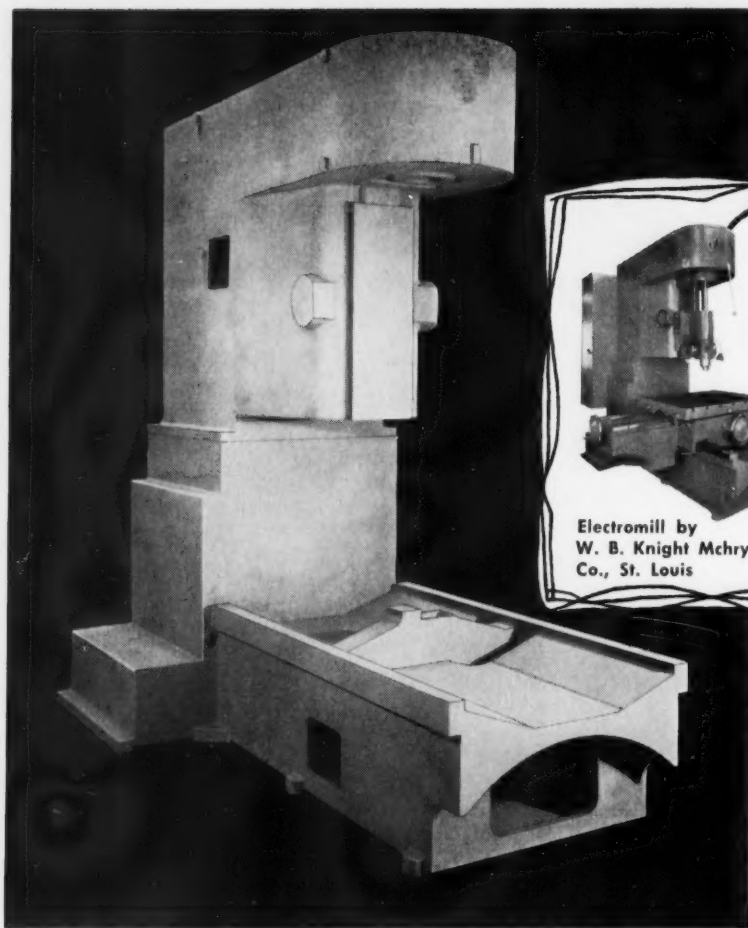
Hydraulic Openside Shapers reciprocate the work instead of the tool and produce planer accuracy with shaper speed. When you modernize your production facilities plan on Hydraulic Shapers, Planers and Slotters to provide the fastest, most economical production methods.

## ROCKFORD MACHINE TOOL CO.

2500 Kishwaukee Street

Rockford, Illinois

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Electromill by  
W. B. Knight Mchry.  
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**LITTLEFORD**

weldments give you  
greater design freedom!

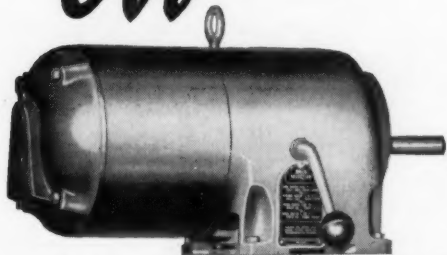
The new design freedom that Littleford weldments allow you, can open up broad new sales frontiers for your products. And Littleford weldments can be made quickly, with utmost

precision and at surprisingly low cost. Why not send us your blueprint today for complete information and estimate? Littleford Bros., Inc., 433 E. Pearl Street, Cincinnati 2, Ohio.

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# LIMA GEARSHIFT DRIVES

## Offer



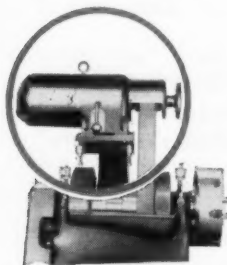
- ★ INCREASED PRODUCTION
- ★ GREATER MACHINE FLEXIBILITY
- ★ LOWER OPERATING COSTS

If you want to *increase* production and *reduce* operating costs—eliminate obsolete overhead lineshafting!

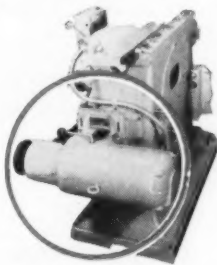
LIMA GEARSHIFT DRIVES have been designed to individually motorize all types of machine tools and production equipment — economically.

Why not let our experienced Sales Engineering Staff help solve your motorizing problems—an accurate survey of your requirements involves no obligation.

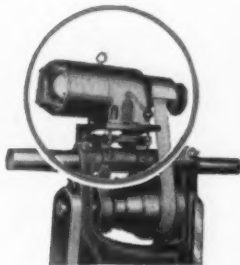
Write today for complete information.



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MILLING MACHINE

# LIMA

Coast To Coast Representation  
GEARSHIFT DRIVES & MOTORS

THE LIMA ELECTRIC MOTOR COMPANY

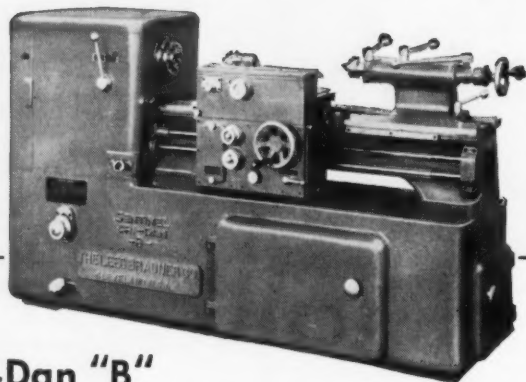


171 FINDLAY ROAD, LIMA, OHIO

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# Threading Problem?

## Here's the answer!



### Cri-Dan "B" single-point threading machine

Rugged, versatile and FAST, the Cri-Dan threading machine will consistently produce class 3 threads from 8 to 40 TPI, right or left-hand, single or multi-start, internal or external.

Production runs? Semi-automatic operation makes them a cinch! Job lots? 15 minute change over and simplicity of tooling cut your costs on small lot runs, too!

Get the full story—call your local Lees-Bradner representative. Or write us direct.

CRI-DAN DIVISION

*the* **LEES-BRADNER** *Company*  
CLEVELAND 11, OHIO, U.S.A.

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# NO OTHER DRILL IN ITS RANGE GIVES YOU SO MUCH FOR THE PRICE!

*"Buffalo"*

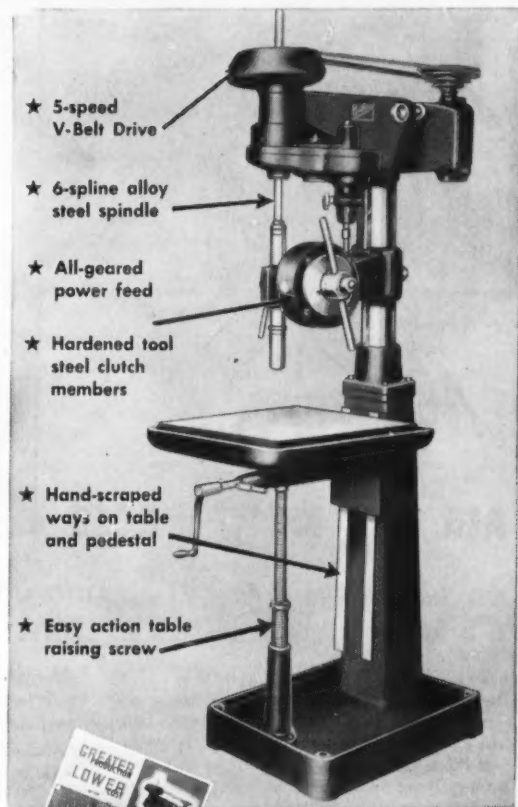
## No. 16 DRILL

*"Proven in Production"*

Check price, design, and standard of construction — you'll find this  $\frac{7}{8}$ " capacity drill a top value. No, you won't find fancy chrome trim or cost-hiking gadgets — but soundly engineered features like those shown here — features that make drilling easier, that promote accurate work and that add years to the drill's useful life. In short, features that cut your drilling costs.

Write today for details, including Bulletin 2730G, and see why more and more users every day are calling the "Buffalo" No. 16 their best buy!

The Machine Tool Show—  
Chicago, Illinois—  
Sept. 6-17



Above, No. 16 Pedestal Drill with 12" overhang and power feed. Price on request.



## BUFFALO FORGE COMPANY

388 Broadway

Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING

PUNCHING

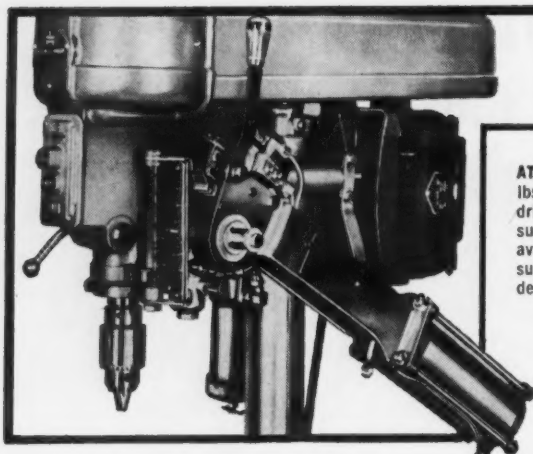
SHEARING

BENDING

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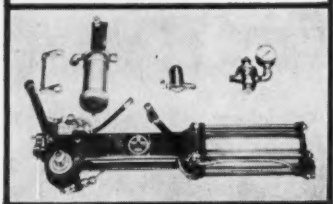
May, 1955

modern machine shop 37



AT LEFT:  $\frac{1}{8}$ " drill operates on 5 lbs. to 7 lbs. air pressure;  $\frac{1}{2}$ " drill on 20 lbs. to 25 lbs. air pressure. Feed pressure at drill point averages 14x greater than air pressure, i. e. air pressure at 20 psi delivers 280 psi at drill point.

BELOW: Major components of new W-T Air Feed. No "electrics". No "hydraulics". Installs in about 10 minutes, no machining necessary. Just connect to nearest air supply.



PAT. PENDING



## AIR FEED DRILL PRESS

**Ingenious Air Feed gives you AUTOMATIC CYCLING FOR PRODUCTION DRILLING — AT LOWEST POSSIBLE COST!**

*What does it cost?* W-T Air Feed Drill Press is available at modest cost. For example: a W-T 15"-4" Travel Drill Press complete with motor and Air Feed is priced from \$344.00. You can get the Air Feed unit only at \$185.50 to fit your W-T Drill Press (or any W-T type up to 6" spindle travel). Compare these prices!

*Profitable?* W-T Air Feed is 100% pneumatic... requires virtually no maintenance... gives fully dependable, low-cost, automatic performance for a wide range of production operations. Does not interfere with any function, swing or position of the machine.

*Accurate?* Air feed control — including checking and slowing-down at several points and at the break-through point—is accomplished by ingenious micro-valve ac-

tion. By positioning a valve stop, spindle will feed and retard continuously and automatically. Accuracy holds within 0.003".

*Available?* Your Walker-Turner Distributor has W-T Drill Presses equipped with W-T Air Feed. You'll find him listed in your local telephone directory. Call him, today.

## WALKER-TURNER

• DIVISION •

KEARNEY AND TRECKER CORPORATION  
PLAINFIELD, N. J.

DRILL PRESSES—Hand and Power Feed • AIR FEED DRILL PRESS ATTACHMENT • RADIAL DRILLS • Wood and Metal Cutting BAND SAWS • TILTING ARBOR SAWS • RADIAL SAWS • JIG SAWS • LATHES • SPINDLE SHAPERS • JOINTERS • BELT AND DISC SURFACERS • FLEXIBLE SHAFT MACHINES

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# Tool Grinders

BY

## EX-CELL-O



**FOR CARBIDES—  
CAST ALLOYS—  
HIGH-SPEED STEELS**

Ex-Cell-O's complete line of tool grinders sharpen single-point tools efficiently and economically. All are double-end models. All use cup-type wheels and have large easy-to-adjust tool rest tables.



There's an Ex-Cell-O Grinder to suit the needs of every shop, large or small. For data on Ex-Cell-O's complete Tool Grinder line, write to Detroit, or call your local Ex-Cell-O representative.

Style 44-A Ex-Cell-O Precision Carbide Tool Grinder is one of the newest models. With inbuilt motor precision spindles, and ample coolant pressure flow, it does fast work on a wide range of tool sizes.

**EX-CELL-O  
CORPORATION  
DETROIT 32, MICHIGAN**

55-7

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

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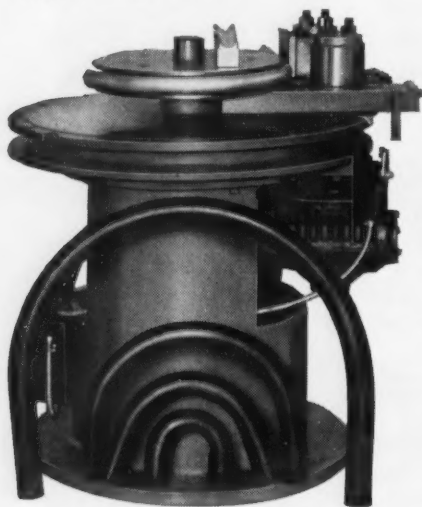
# reach !

## A NEW PEAK IN BENDING EFFICIENCY

Pedrick Production Benders offer new standards of efficiency and economy for all pipe, tube and structural bending. Even the most difficult bends can now be made on a production or jobbing basis.

Let us know your problem—and supply a cost-cutting solution.

Write PEDRICK TOOL & MACHINE CO.,  
3640 N. Lawrence St., Philadelphia  
40, Pa. Dept. 5.

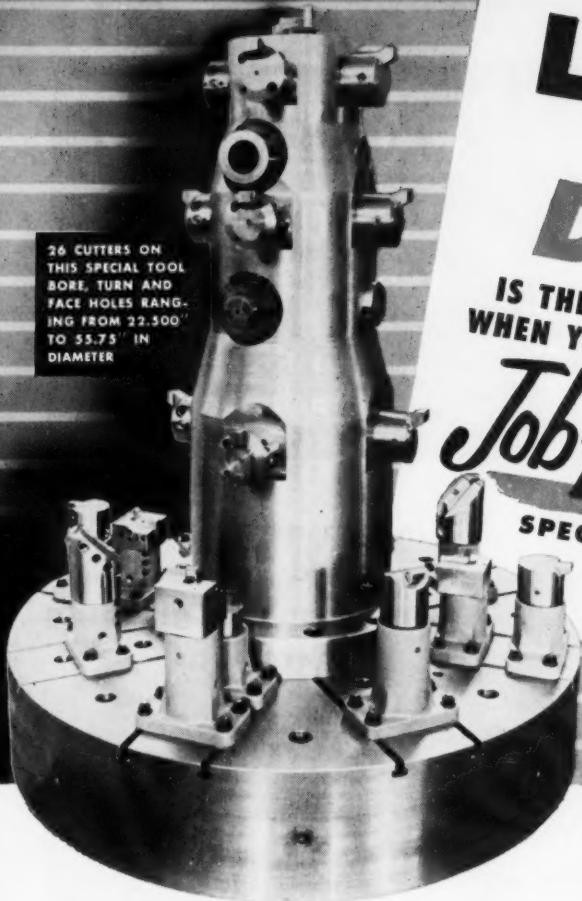


FREE "PEDRICK LINE" BULLETIN.  
WRITE TODAY.

# PEDRICK

## production benders

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26 CUTTERS ON  
THIS SPECIAL TOOL  
BORE, TURN AND  
FACE HOLES RANG-  
ING FROM 22.500"  
TO 55.75" IN  
DIAMETER

# LARGE

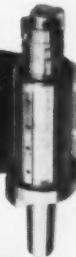
or small...

# DAVIS

IS THE FIRST NAME TO CALL  
WHEN YOUR MACHINING NEEDS

## Job-Engineered

SPECIAL TOOL DESIGNS



2 BLOCK-TYPE CUTTERS  
IN THIS SPECIAL TOOL  
ROUGH, FINISH AND  
COUNTERBORE HOLES  
RANGING FROM  
2.180" TO 2.420"  
IN DIAMETER

Yes, large or small, simple or complex, you always tool jobs better with Davis. One reason is the big, extra bonus of machining know-how that goes into every Davis tool.

In the design of special tools, like those above, Davis' broad experience and unsurpassed engineering skill assure recommendations complete in every detail of speeds, feeds, fixtures and maximum combination of multiple operations into single tools for increased production at lowest cost.

### DAVIS ALSO OFFERS INDUSTRY'S MOST COMPLETE STANDARD TOOL LINE

In standard blocks, boring heads, bars, and tool sets, the Davis line features thousands of items to assure unrestricted selection in tooling up virtually any routine job.

Your local Davis Field Engineer is as close as your telephone, and behind him are the complete facilities of Davis' application engineering department, ready to serve you with special or standard tools.

# DAVIS

BORING TOOL DIVISION of  
Giddings & Lewis Machine Tool Company  
Fond du Lac, Wisconsin



THE ONE NAME THAT CERTIFIES ULTIMATE PRECISION AND PRODUCTIVITY IN TOOLING

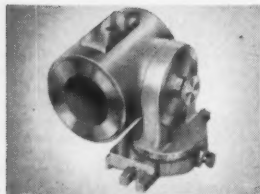


## EXCEL No. 6

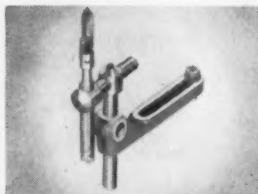
### CUTTER AND TOOL GRINDER

... plus these  
attachments ...

increases the  
scope and accuracy  
of your tool grinding  
operations



**LARGE UNIVERSAL FACE MILL GRINDING ATTACHMENT.** Swivels 360° vertically or horizontally. Ball bearing spindle has No. 50 National Standard taper. Lip rests can be fastened to spindle housing and lock screw is provided for spindle.



**UNIVERSAL TOOTH REST WITH MICROMETER ADJUSTMENT.** Micrometer barrel has .001 graduations and lip rest is moved .050 per revolution of dial. Maximum screw adjustment is 1".



**RADIUS GRINDING WHEEL DRESSER.** Dresses grinding wheel with predetermined concave or convex radius from 0 to 3/4". Diamond nib mounted in holder and set to gage at top which is swung out of way when not in use. Furnished with diamond. Ht., diamond to base, 5-5/32".

For full information, send now for Bulletin M-55



# PRECISION GRINDERS

BENTON HARBOR  
MICHIGAN

HYDRAULIC & HAND FEED SURFACE GRINDERS • UNIVERSAL CUTTER & TOOL GRINDERS • DRILL GRINDERS

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# How many different 10x10 DANLY DIE SETS

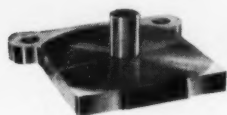
can you order from stock at your nearby **DANLY Branch?**

☐ 100 ?

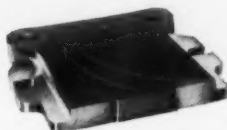
☐ 1251 ?

☐ 4763 ?

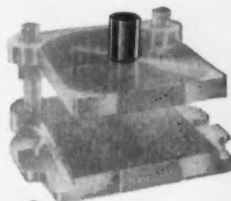
☐ 31,104 ?



**3** different punch holder thicknesses



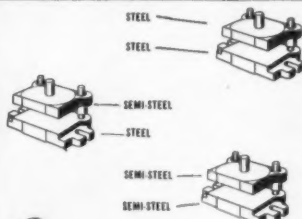
**3** different die shoe thicknesses



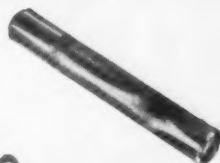
**6** shank size variations



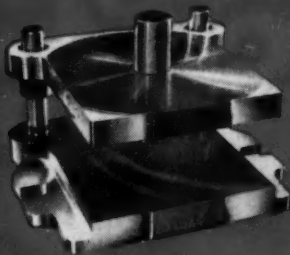
**4** bushing type variations



**3** different material combinations



**16** guide post lengths in each of  
**3** different styles to choose from



Multiply all of these combination possibilities together and you'll discover that there are **31,104** different standard Danly Die Sets in just this *one* size . . . and all are cataloged and *stocked* in the Danly Branch near you. Amazing? Yes, but it serves to illustrate an important point for *your* benefit. The almost unlimited variety of Standard Danly Die Sets *in stock at your Danly Branch* will meet your specific needs exactly . . . and fast. So remember, when you want the best in die sets in the shortest time, the place to call is your local Danly Branch.

**DANLY MACHINE SPECIALTIES, INC.** 2100 South Laramie Avenue, Chicago 50, Illinois

Choose the Danly Branch closest to you:

**BUFFALO 7**  
1807 Elmwood Avenue  
**CHICAGO 50**  
2100 S. Laramie Avenue  
**CLEVELAND 14**  
1550 East 53rd Street  
**DAYTON 7**  
3196 Delphos Avenue  
**DETROIT 16**  
1549 Temple Avenue

**GRAND RAPIDS**  
113 Michigan Street, N.W.  
**INDIANAPOLIS 4**  
5 West 10th Street  
**LONG ISLAND CITY 1**  
47-28 37th Street  
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4890 South Alameda

**MILWAUKEE 2**  
111 E. Wisconsin Avenue  
**PHILADELPHIA 60**  
511 W. Courtland Street  
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**DANLY**

DIE SETS . . .  
STANDARD OR SPECIAL  
DIEMAKERS' SUPPLIES

Top-SK-1665-4

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010477

ONTARIO

ONWARD

SARATOGA

4-001988S

FOOTNOTES

# LUDLUM TOOL STEELS are clearly marked

## ... you can't mix up grades in your stock



For  
Production Men Only

### "TOOL STEEL HANDBOOK"

We say "production men only" because this is a *work* book, not a picture book. It's a case-bound volume of 196 pages, packed full of technical data on the analyses, uses, handling and shop treatment of all grades of A-L Tool and Die Steels. Sent free, but ask for it on your company letterhead, please.

Address Dept. MS-65

"What's *that* piece?" . . . "Are you *sure*?" . . . In anybody's toolroom or stock racks, the best inventory or material identification system is apt to go haywire once in a while—and sometimes with grievous results.

*But not when you're using tool steel grades produced by A-L!* Each length of Ludlum Tool Steel is clearly marked with its grade name every few inches the entire length of the bar—*stencilled* in such a manner that the marking

stays bright and clear, and can't be blurred or wiped off in handling.

Even a small crop end on a machine bench is readily identifiable—you can't go wrong. And that's only a small part of the benefit you can realize by using Ludlum Tool Steels—available from stocks coast to coast. Let our Metallurgical Service go to bat on some of your tougher tool steel problems. *Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.*



For complete MODERN Tooling, call  
**Allegheny Ludlum**

W&O 9221

For more data circle 244 on Reader Service Card

# Announcing



## MICROGAGES

.000008" ACCURACY



**81-BLOCK SET  
\$250.00**

# 30%

*more wear surface  
than rectangular blocks*

Two really new and important facts should be noted in this announcement by Van Keuren: the closer tolerance of  $\pm .000008$ " on VK Microgages, and the 81-block combination of  $\frac{1}{16}$ " diameter longer-wear gages . . . now available for the first time.

These fine quality precision gage blocks by Van Keuren are products of the same machine-lapping and inspection techniques as Van Keuren Rectangular and Solid Square gage blocks. Size tolerance as already noted is guaranteed, as well as a maximum surface roughness of 1 RMS. Because their round shape provides greater wear surface, Van Keu-

ren Microgages can be depended on for longer life and lower cost. Their closer tolerance has been particularly developed to meet today's demands for more exacting precision in shop work.

In addition to the new 81-block closer tolerance set featured here, Van Keuren offers 15 other standard sets of Microgages; also Solid Square type sets of gage blocks in .000004" accuracy and Rectangular type sets in .000004" and .000008" accuracy. For further information address: The Van Keuren Co., 175 Waltham St., Watertown, Mass.

*"Quality in Millionths"*



THE *Van Keuren* co.,

175 WALTHAM STREET, WATERTOWN, MASS.

Light Wave Equipment • Light Wave Micrometers • Gage Blocks • Taper Insert Plug Gages • Wire Type Plug Gages • Measuring Wires • Thread Measuring Wires • Gear Measuring System • Shop Triangles • Carbide Cemented Carbide Plug Gages • Carbide Cemented Carbide Measuring Wires • Chrome Carbide Taper Insert Plug Gages



For more data circle 245 on Reader Service Card



**one must set the example  
...and with high speed steel  
it's REX**

It's a real satisfaction when you set the example by what you make . . . when it becomes a *standard for comparison*. That's why Crucible is proud to have kept REX high speed steel tops in its class for so many years.

But don't take our word for REX's superiority. Try it on your own work. Compare its structure, finish, hardenability, carbide distribution and general uniformity. You'll see for yourself why it's the *standard* wherever high speed steels are used.

Remember, REX is made only by Crucible. So call for REX at your nearby Crucible warehouse, or for quick mill delivery—Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 22, Pa.

**CRUCIBLE**

first name in special purpose steels

**Crucible Steel Company of America**

For more data circle 246 on Reader Service Card

May, 1955

modern machine shop 47

## A BIT OF BALANCE

Try it  
and get more  
for your money

**du MONT**

High Speed, Ground  
Square and Rectangular  
**TOOL BITS**

have the wear resistance,  
toughness and red hardness  
precisely balanced so that  
you get *more cuts per bit and  
per dollar.*

They keep a keener cutting  
edge over a longer period.

Make your own performance  
tests and cost comparisons  
and you'll specify du Mont  
H. S. Tool Bits from then on.

The du MONT CORPORATION,  
Greenfield, Mass.

MAIL FREE Tool Bit COMPARISON  
CHART, CATALOG and PRICE LIST  
S to

Name.....

Company.....

Address.....

For more data circle 247 on Reader Service Card

## Meetings

### Important Meeting Dates

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

**May 9-11** • Metal Treating Institute, Annual Spring Meeting, Ambassador Hotel, Los Angeles. Institute headquarters: 271 North Ave., New Rochelle, New York.

**May 10-12** • Metal Powder Association, 11th Annual Meeting and 1955 Metal Powder Show, Bellevue-Stratford Hotel, Philadelphia. Association headquarters: 420 Lexington Ave., New York 17, New York.

**May 12-14** • American Institute of Industrial Engineers, 6th Annual Conference and Convention, Kingsway Hotel, St. Louis, Missouri.

**May 16-20** • American Materials Handling Society, 1955 National Materials Handling Exposition, International Amphitheater, Chicago. Information: Clapp & Poliak, Inc., 341 Madison Ave., New York 17, New York.

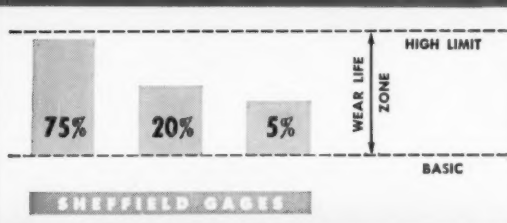
**May 31-June 3** • Third Basic Materials Exposition, Convention Hall, Philadelphia. Information: Clapp & Poliak, Inc., 341 Madison Ave., New York 17, New York.

**June 7-10** • American Welding Society, National Spring Meeting, Hotel Muehlebach, Kansas City, Mo. Society headquarters: 33 W. 39th St., New York 19, New York.



# WHY SHEFFIELD THREAD GAGES Wear Longer

Especially supersensitive production equipment controlled by high amplification instruments, plus Master Craftsmen make it practicable to hold the finished size of Sheffield thread gages unusually close to the gagemaker's high tolerance limit.



Purchasers of Sheffield thread gages can, on the average, expect to receive 75% of them within the upper third of the gagemaker's tolerance zone, 20% about half way and the rest between that point and basic.

**SPECIFY SHEFFIELD** and get more for your gage dollars.

**SPECIFY "Reversible" Thread Plug Gages** and save even more.

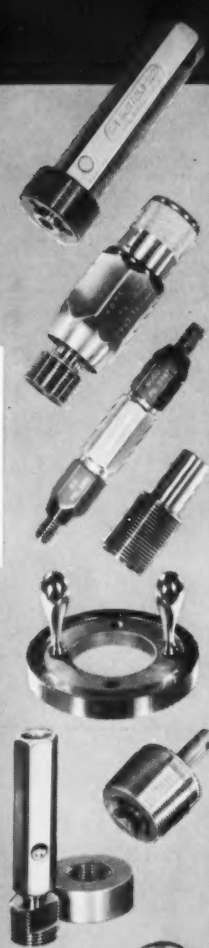
Gage Division, The Sheffield Corporation  
Dayton 1, Ohio, U.S.A.

See us at the  
Machine Tool Show, Booth 1305



# SHEFFIELD

MANUFACTURING AND MEASUREMENT FOR MANKIND



For more data circle 248 on Reader Service Card

# Why you get top savings with The "CROWN<sup>👑</sup> JEWELS"



Buying diamond wheels calls for the same trust in the supplier as buying gem diamonds. Right there is where Norton's long leadership in diamond wheel development and manufacture is your best possible safeguard. Only Norton offers you such long diamond wheel experience to help you produce more at lower cost.

Check these reasons why Norton diamond wheels are the recognized "Crown Jewels" of the entire field:

🔍 *Norton was first to introduce the three major diamond wheel bond types — resinoid, metal and vitrified.*

🔍 *The sizing, grading and laboratory checking of diamonds used in Norton diamond wheels is done in Norton's own plant.*

🔍 *Norton duplicates specifications for each wheel type and size with utmost accuracy for uniform top performance.*

🔍 *The line of Norton diamond wheels is complete, with sizes and types covering every field — carbides, stone, glass, ceramics, electronics, etc. — where diamond wheels are used.*

🔍 *Norton diamond wheels for every need are quickly available from full stocks in Worcester, five strategically located warehouses and Distributor's stocks.*

## *See your Norton distributor*

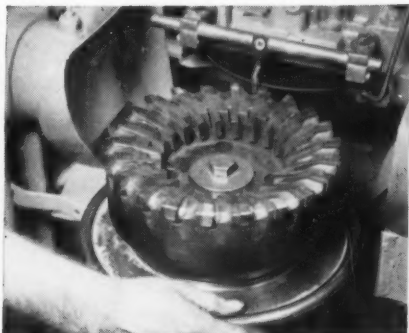
for further facts on Norton diamond wheel performance and applications. Ask him for the 142-page illustrated booklet, *Grinding Carbide Tools* and for the complete, net priced, diamond wheel catalog. Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities, listed under "Grinding Wheels" in your phone directory, yellow pages. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

# Norton Diamond Wheels... for carbide grinding

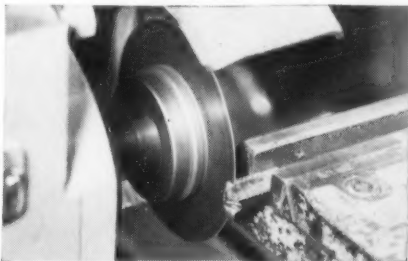


**For Top Savings In Production Grinding** of single point carbide tools, use Norton vitrified bonded diamond wheels. Combining fast cutting action with high resistance to grooving, they're also often preferred for grinding chip breakers and for a wide range of precision grinding. This Norton engineered bond holds each diamond particle for maximum useful cutting action and long, money-saving wheel life.

**For Top Savings In Reconditioning** dull or chipped carbide tools, Norton metal bonded diamond wheels are recommended. They're also most economical for many other jobs where durability and resistance to grooving are preferred, rather than a fast rate of cut.



**For Top Savings In Multi-Tooth Grinding**, Norton resinoid bonded diamond wheels assure uniform size to each individual cutter tooth. Their extra fast cutting action and long service life are big advantages in precision sharpening. Two bond types — regular, for wet grinding and B6, for dry applications.



W-1611

*Making better products...  
to make your products better*

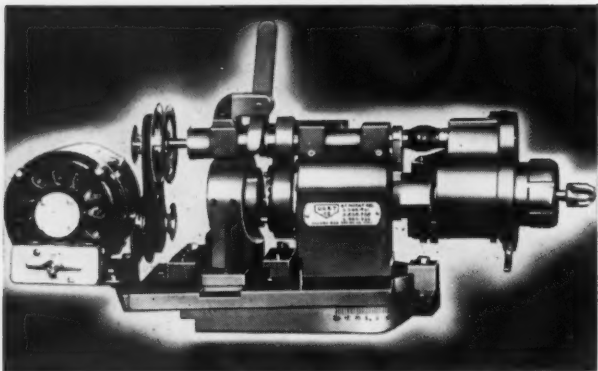


**and its BEHR-MANNING division**

NORTON: Abrasives • Grinding Wheels • Grinding Machines • Refractories  
BEHR-MANNING: Coated Abrasives • Sharpening Stones • Pressure Sensitive Tapes

For more data circle 250 on Reader Service Card

## Precision CIRCULARITY GRINDING ATTACHMENT



Simple, speedy set-ups on this accurate attachment permit fast and easy grinding of form relief, radial relief, form and radial relief together, tapered cylindrical and straight cylindrical. Cutting tool to be produced or reworked is held in collet or between dead centers and revolves on its own axial center. Where full length of spiral cutting tools is to be ground for both form and radial relief, the Circularity Grinding Attachment travel is similar to an O.D. grinder, which insures fine finish, back taper and accurate size.

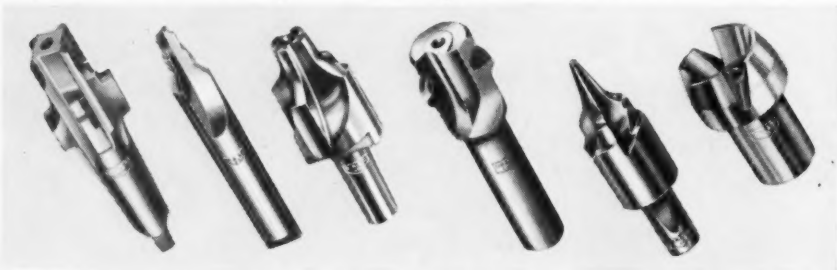
The Detroit Reamer & Tool Company Model 500 Circularity Grinding Attachment shown above is faster, easier to handle, has positive control, greater adaptability, rugged construction, and is engineered and precision built to provide the finest in precision work. Therefore, it will be of invaluable assistance to anyone whose tooling standards must meet modern production requirements.



*You Can Grind  
Tools Like These*

**on a DETROIT REAMER  
CIRCULARITY GRINDING  
ATTACHMENT**

## Special Cutting Tools of **DEPENDABLE QUALITY**



The Detroit Reamer & Tool Co. Plant is equipped with the finest in modern machinery and inspection facilities to provide you with the ultimate in precision tools. Our Engineering and production personnel with 35 years of empirical

knowledge behind them are completely qualified to expertly handle your tool needs. For dependable cutting tools—specify Detroit Reamer & Tool Co.

# DETROIT REAMER & TOOL CO.

2830 EAST SEVEN MILE ROAD • DETROIT 34, MICHIGAN



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# modern machine shop

## ADVERTISING REPRESENTATIVES

**Granville M. Fillmore, Vice President**, 342 Madison Ave., New York 17, N. Y., Murray Hill 7-7390. Eastern New York State, Connecticut, Massachusetts, Rhode Island, Vermont, New Hampshire, Maine.

**Duncan W. Barton**, 342 Madison Ave., New York 17, N. Y., Murray Hill 7-7390. Eastern Pennsylvania, Central New York State, New Jersey, Maryland, Delaware, Washington, D. C., Long Island, Brooklyn.

**George E. Hay**, 431 Main Street, Cincinnati 2, Ohio, MAIn 0182. Western Pennsylvania, Western New York, Ohio, Kentucky, Southern Indiana.

**John M. Krings, Vice President**, Tribune Tower, Chicago 11, Illinois, DElaware 7-5441. Western Michigan, Illinois, Wisconsin, Iowa, Minnesota, the Dakotas, Northern Indiana.

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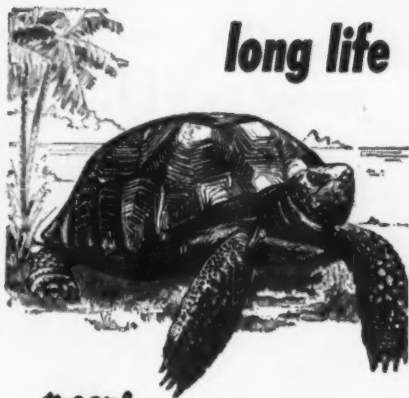
**The Robert W. Walker Company**, 2330 West Third St., Los Angeles 5, Calif., DUmkirk 7-4388; 57 Post St., San Francisco 4, Calif., SUTter 1-5568. California, Oregon, Washington.

★ ★ ★

**modern machine shop**  
431 Main St. Cincinnati 2, Ohio

May, 1955

# long life



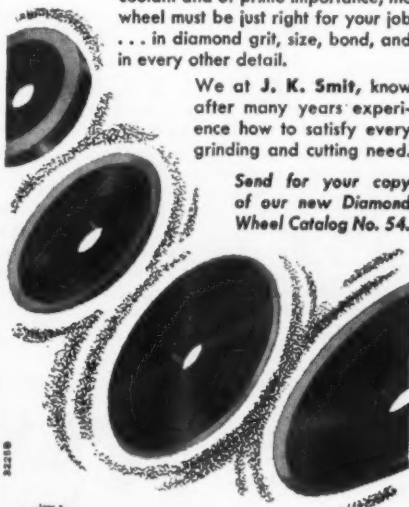
## means dollars saved!

Whether a 200 year old tortoise would admit this statement is debatable, but with Diamond Wheels it is an indisputable fact.

Even then, long wear depends upon many factors; Speed, correct use of coolant and of prime importance, the wheel must be just right for your job . . . in diamond grit, size, bond, and in every other detail.

We at J. K. Smit, know after many years experience how to satisfy every grinding and cutting need.

Send for your copy of our new Diamond Wheel Catalog No. 54.

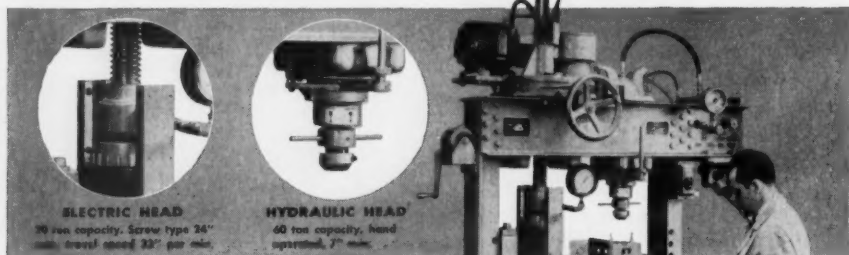


**J. K. SMIT & SONS, INC.**  
HOME OFFICE AND PLANT  
MURRAY HILL  
NEW JERSEY

For more data circle 252 on Reader Service Card

modern machine shop 53

... this "double-headed" Lempco press  
proved its **VERSATILITY** for the makers  
of Johnson's Wax Lubricants!



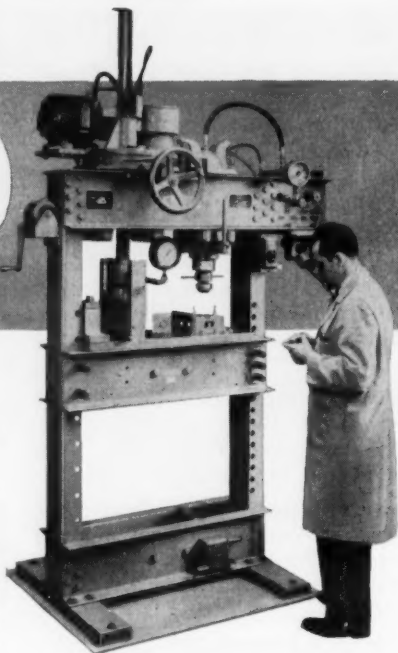
## LEMPCO

can solve your special  
pressing problems, too!

Two heads proved better than one in solving the pressing problems encountered in the technical laboratory of S. C. Johnson & Son, Inc. . . . world famous manufacturer of wax products for home and industry.

The varied problems that arise in evaluating and testing wax lubricants and drawing compounds made a *versatile* press an absolute necessity. Lempco answered this need with this special press incorporating a unique arrangement of an electric operated ram and a hydraulic operated ram which are used independently of each other.

This is just one of many special presses that Lempco has designed and built for a number of America's largest companies.



### TAKE YOUR PRESS PROBLEMS TO LEMPCO

. . . specialists in designing and building custom-made presses. In addition, Lempco has a full line of standard presses. So, whatever your press needs may be, special or standard, you can depend on Lempco to meet your requirements — *exactly*. Lempco engineering service endeavors to answer all inquiries within 48 hours.

Address all inquiries to LEMPCO INDUSTRIAL, INC., 5500 Dunham Road, Bedford, Ohio

BEDFORD

# LEMPCO

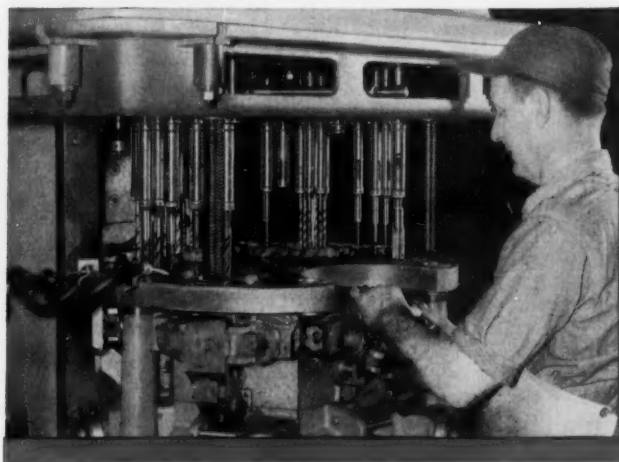
OHIO, U. S. A.

*For 35 Years - a Leading Builder of Machine Tools*

For more data circle 253 on Reader Service Card



# HOW SEIBERT SPINDLES HELP SUNDSTRAND BUILD BETTER PUMPS



★ For 4 years, Seibert Multiple Drill Spindles have been helping maintain close tolerance standards at the Hydraulic Division of the Sundstrand Machine Tool Co., Rockford, Illinois. Multiple spindle drilling machines, as shown in the photo above, are equipped with 32 Seibert Slip Spindles and Adapters of varying sizes, for drilling, reaming, chamfering, and spot facing cast Iron Fuel Unit Pump Bodies. Tolerances are held to within .002" of basic location, at spindle speeds ranging from 805 to 2760 R.P.M.

Investigate today, the three advantages of standardizing with Seibert production holding tools. You will find they will meet your most exacting tolerance requirements because they are precision built . . . you save money too, for Seibert holding tools are lot produced in a wide range of standard sizes . . . and your orders receive prompt, efficient handling because Seibert specializes in the manufacture of production holding tools only.



## FREE DATA

Write for Folio 1-50 illustrating and describing the complete line of Seibert Multiple Drill Spindles.



◀ Upper and Lower Drive Assemblies



◀ Pinion Drive Shafts



◀ Universal Joints



◀ Bracket Spindle Assembly



Adaptor ▶

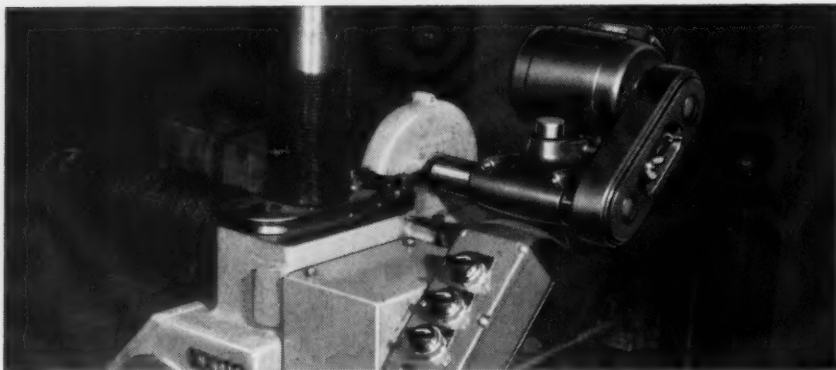


**SEIBERT & SON, INC. CHENOA, ILLINOIS**

*Quality* MULTIPLE DRILL SPINDLES AND PRODUCTION TOOLS

For more data circle 254 on Reader Service Card

## Dumore Tool Post Grinders triple spring-ring output at Perfect Circle



**A DUMORE No. 5 TOOL POST GRINDER**, in effect, acts as the cutting head on this sizer. Spring stock on the vertical column is threaded around an index wheel. The machine automatically indexes to a pre-determined stock length. Then, the grinder's wheel feeds in, cuts and retracts—automatically. Two operators run four machines. Total output is two springs per second. Stock is hardened and tempered high carbon steel.

**Calls in distributor** ▶

**Triples output** ▶

**Cuts maintenance** ▶

The Perfect Circle Corp. of Hagerstown, Ind., wanted a machine to speed spring and ring sizing. In studying the problem, they called in their Dumore Distributor—Vonnegut Hardware Co. Perfect Circle's Chief Process Engineer, Mr. L. B. Ware, writes that the Dumore men "gave us excellent service and advice." Not only did we solve the sizing problem but "we're now very conscious of what we might be able to do on similar jobs."

With the installation of four automatic sizers, output per operator has been tripled.

"The Dumore Grinders", Ware adds, "are performing very well. Spindles run smooth and cool. Maintenance has been surprisingly low."

*If you have a problem requiring unusual setups or development of special tools, contact your Dumore Distributor. Chances are he'll be able to show you versatile Dumore Precision Tools can handle the job efficiently, economically. Write for new Dumore Catalog No. 54.*

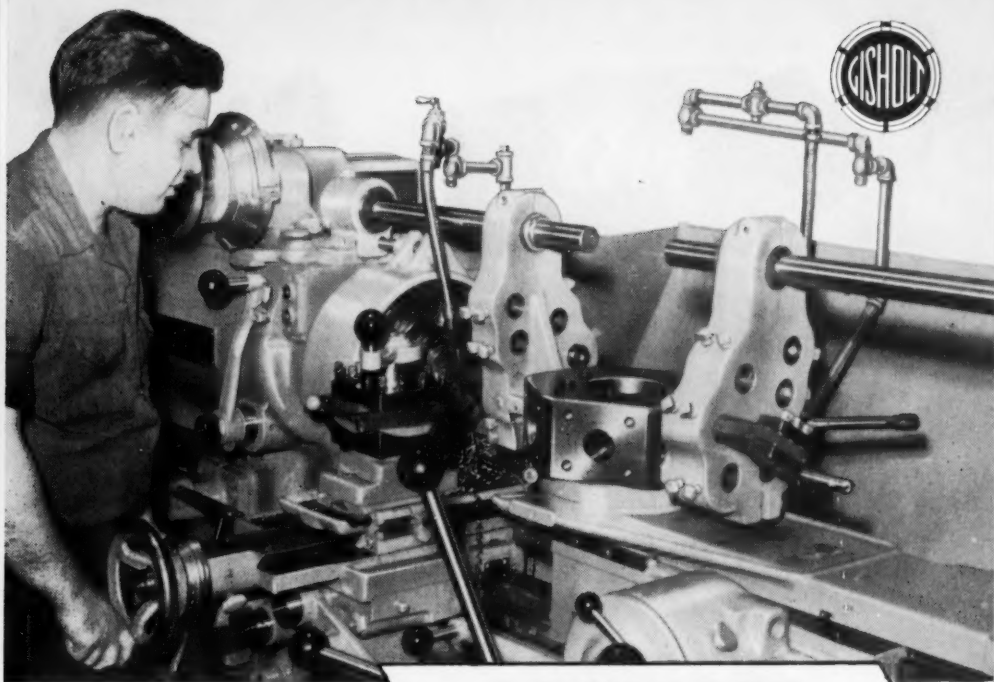


**DUMORE**  
PRECISION TOOLS

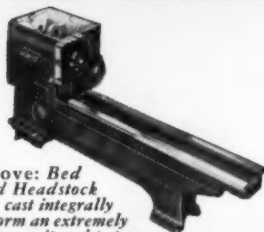
Builders of a precision line of Grinders, Automatic Drill Heads, Tool Post Grinders, Drill Grinders, Light Drilling Equipment, Flexible Shaft Tools, Hand Grinders, Fractional hp motors and Gear Motors.

1311 - 17TH ST., RACINE, WISCONSIN

For more data circle 255 on Reader Service Card



## ACCURACY that doesn't "wear off"



*Above: Bed and Headstock are cast integrally to form an extremely heavy unit and to provide the rigid foundation for all types of work.*

*Below: Block type ways are straddle keyed to the bed and ground in perfect alignment with the spindle. All working surfaces are hardened to 64-66 Rockwell "C".*



Here are two good reasons why you can count on the accuracy of Gisholt Turret Lathes—now and years from now.

One-piece bed and headstock, cast as a heavy, rigid unit, reduce distortion and vibration to a minimum. Headstock is jig-bored to insure—and maintain—perfect alignment of spindle and drive shafts, with ample metal to provide the most solid support possible.

Hardened steel ways are augmented by hardened steel strips secured to the ram saddle, as well as hardened steel gibs and clamps, making an assembly that is virtually wear-proof. Its accuracy is further preserved by force lubrication.

These advantages are yours for the long life of any Gisholt Turret Lathe. Ask for complete details.

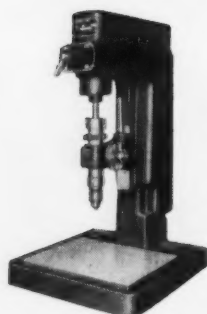
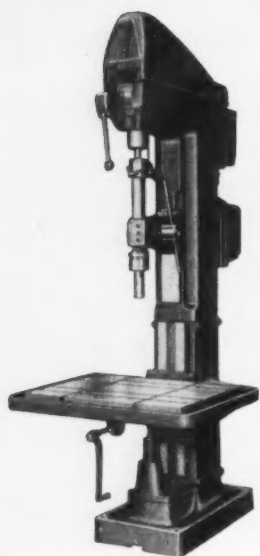
THE GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.



# GISHOLT

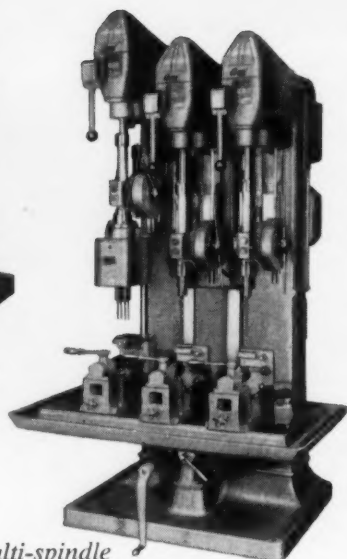
MACHINE COMPANY

Madison 10, Wisconsin

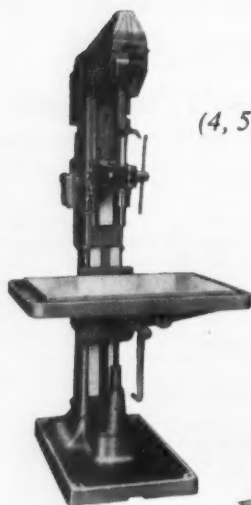


(1) Bench type

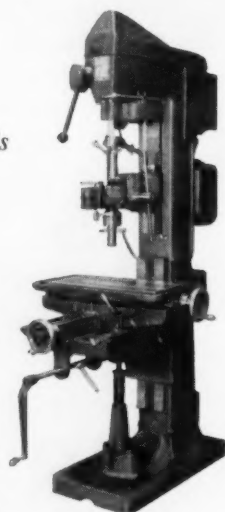
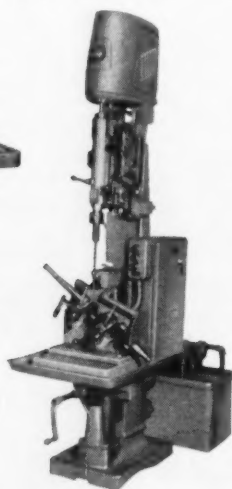
(2) Column type



(3) Multi-spindle



(4, 5, 6) Tool room drills





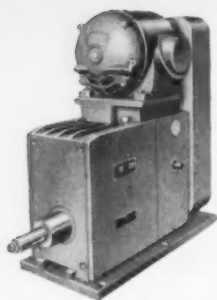
Whatever your light and medium duty drilling needs, it's a sure bet that the machine you need is made by Avey. The whole Avey line would pack this magazine with pictures—would give you every combination of size, capacity, speed, overhang, and table arrangement to fit your requirements. The ones shown will give you the general idea. Write for literature.

## Avey has the right one

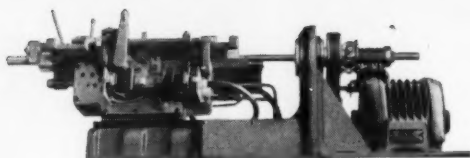
*(Figures 1 through 6) Standard Drilling and Tapping Machines.* Capacities in cast iron from very small numbered drills to 1½"; 6 or 8 speeds up to 12,000 rpm; No. 32 Jacobs chuck to No. 4 Morse taper; 4 feeds; 1 to 6 spindles; column or bench type; wide range of swing. Featuring such "bonus" advances as micrometer stop collar; telescoping spindle guard; dynamically balanced rotating parts; rack and pinion operated motor plate; large tool and die shop tables; and Avey's pace-setting spindle construction.

*(4, 5, and 6) Avey tool room drills, built in No. 2 and No. 3 BMA-6 sizes.* Large table 34" x 25"; round table 18" diameter; compound table 25" x 12".

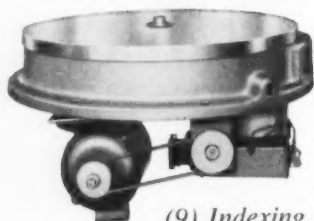
For more data circle 258 on Reader Service Card



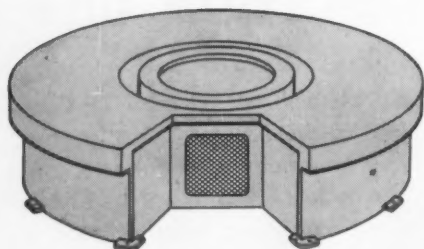
(7) Cam feed unit



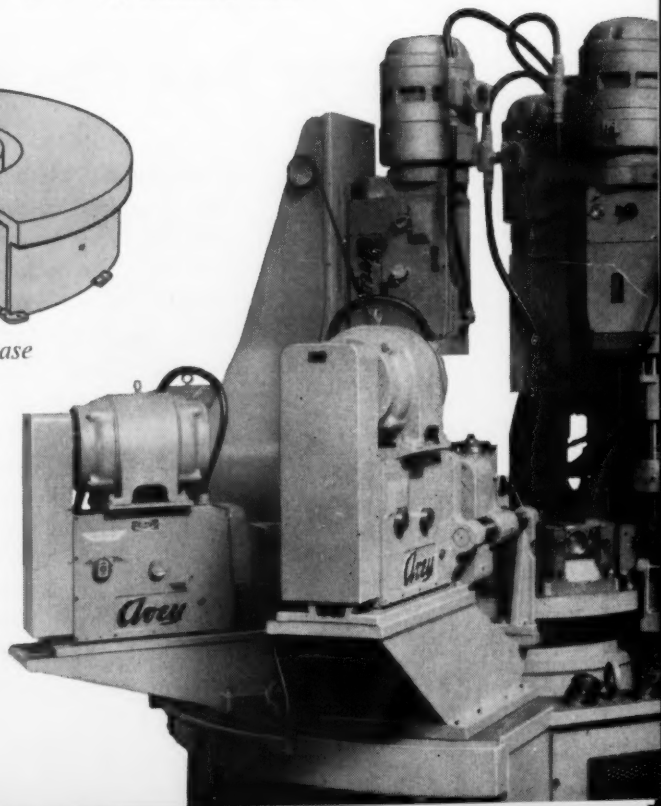
(8) Avey-draulic



(9) Indexing table



(10) Standard base







## **drilling, tapping, production machines**

(7) *Automatic Cam Feed Units.* For drilling, tapping, reaming, hollow milling. Vee belt or gear drive. Nos. 1, 2, and 3 Morse taper. Capacity in cast iron: No. 1, 1/2"; No. 2, 1". Mount at any angle. Fully or semi-automatic. Self-contained, tamper-proof.

## **for Avey makes them all**

(8) *Avey-draulic feed unit.* Automatic withdrawal for chip removal only when necessary during deep hole drilling. Rapid advance, feed, and rapid return. Jump feed attachment available. Standard strokes 12" up to 30". Avey's patented Torque-matic control optional.

(9) *Automatic index tables.* Rapid, accurate indexing to .001". Even or uneven index patterns obtainable. 16" to 48" diameter. All adaptable to Avey standard bases.

(10) *Steel Bases.* One of Avey's standard line of fabricated bases. Stress relieved, sand-blasted, machined, and painted to fit your application. Combine 7, 8, 9, and 10, and you get fast returns on your investment, and a step ahead of your competition!

THE AVEY DRILLING MACHINE CO., CINCINNATI 1, OHIO



# YOUR TURNING-TIME CONCEPTS

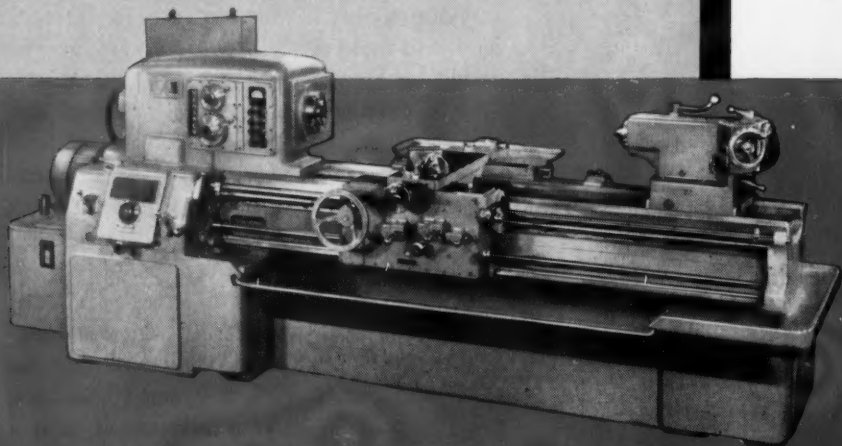
Set it—forget it! That's the story of the Preselector Dyna-Shift. It's the brain Monarch has built into the new Series 62. With it *this* machine will give a greater ratio of metal removing hours to work hours than you ever dreamed possible.

When setting up, merely dial the surface speed wanted and the first diameter to be turned—the Dyna-Shift computes the R.P.M. and makes the shift instantaneously and automatically. (*Time-saver #1*). Then, to maintain this surface speed on successive diameters, set the work diameter selectors. Every speed change thereafter, on every piece in the run, takes place automatically with but one fast dial setting and movement of the work start and stop lever. (*Time-saver #2*). What's more, here at last is the lathe with a speed range so wide as

to take care of all your needs. Its 20 H.P. drive gives you 36 different spindle speeds in a range from 14 to 1750 R.P.M., a ratio of 1 to 125. (*Time-saver #3*).

Nor are the time-saving features of the Series 62 limited to the Preselector Dyna-Shift headstock. There's four-way power rapid traverse which cuts tool positioning time on the average of 50%. There's the totally enclosed and automatically lubricated gear box and end gearing. There's a completely new two speed tailstock. Add them all up and you get a new lathe concept that means Production with a capital P!

You will want to know all about these and many other features in detail. Send the coupon for the greatest turning news in years!! . . . . **The Monarch Machine Tool Company, Sidney, Ohio.**



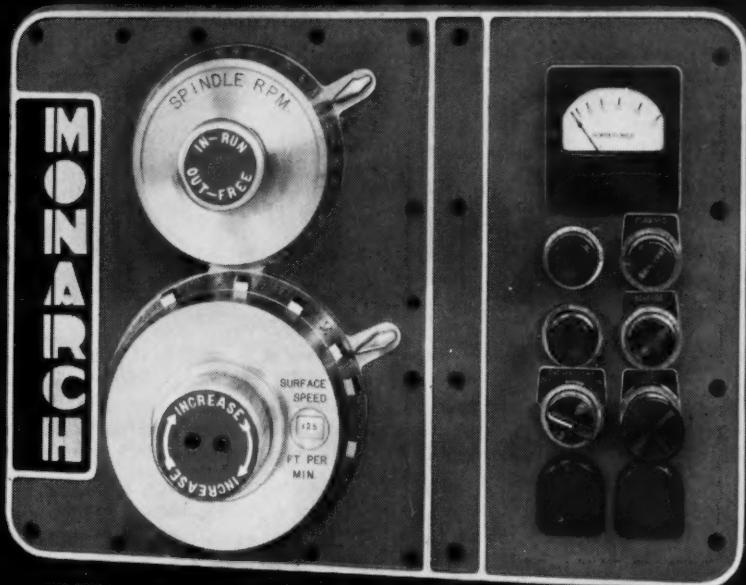
## THE NEW MONARCH SERIES 62 PRESELECTOR DYNA-SHIFT LATHE

Models 130 and 1130 (above)—13" swing over cross slide, 20" clearance diameter.

Models 131 and 1131—16" swing over cross slide, 24" clearance diameter.

# ARE IN FOR A Shock!

See the New Monarch Series 62 Preselector Dyna-Shift  
—Unequaled for Speed and Ease



**FILL OUT COUPON—**and  
attach to your business  
letterhead, please —>



**FOR A GOOD TURN FASTER  
... TURN TO MONARCH**

**THE MONARCH MACHINE TOOL COMPANY,  
Sidney, Ohio**

Gentlemen:

- ☐ I am interested in your Series 62 story.  
Please send me your illustrated Booklet  
#1501 with complete data.
- ☐ Please have a Monarch sales engineer  
call on me.

NAME \_\_\_\_\_ TITLE \_\_\_\_\_

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

# The Bigger Difference Brings BIGGER TIME SAVINGS!

YOUR BRIGHTBOY DISTRIBUTOR  
CAN NOW SUPPLY YOU WITH  
RUBBER-CUSHIONED STOCK ABRASIVES  
MATCHED TO JOB REQUIREMENTS!

THESE TWO WHEELS MAY LOOK ALIKE. But in your shop each could have a widely different application. *They're both alike in that they're both Brightboy. Either one, or any of the other many Brightboy texture combinations frequently can give you up to 50% in time savings!*



One of these Brightboy Wheels is compounded with SILICON CARBIDE, the other with ALUMINUM OXIDE.

In both grains you have wide selection of  
UNIFORM TEXTURES AND GRAIN SIZES RANGING FROM EXTRA FINE TO EXTRA COARSE,  
IN SOFT, FIRM AND TOUGH RUBBER BINDERS.

- ★ YOU CAN NOW CHOOSE A RUBBER-CUSHIONED STOCK ABRASIVE PARTICULARLY MATCHED FOR A GIVEN JOB.
- ★ YOU CAN LARGELY ELIMINATE THE ANNOYANCE, EXPENSE AND DELIVERY DELAY OF MADE-TO-ORDER "SPECIALS".
- ★ YOU CAN COUNT ON DEPENDABLE UNIFORMITY, PROMPT DELIVERY.

*Brightboy burrs, cleans, finishes, precision-polishes, in one fast operation. A Brightboy finish frequently serves as the final polish. Rubber and abrasive, working together, give Brightboy scope and adaptability far beyond other methods—give you a new, wider, almost unbelievable concept of*

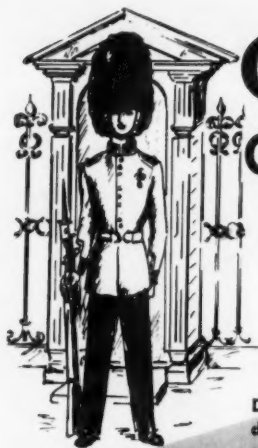
*finishing. Alert production men now explore Brightboy applications as regular routine prior to the setting up of new work jobs.*

*Ask your dealer NOW for details on multi-use Brightboy, and for the new Brightboy catalog. Advise us if he cannot supply you. Write us on any problem where finishing is involved.*



BRIGHTBOY INDUSTRIAL DIVISION  
WELDON ROBERTS RUBBER CO.  
95 North 13th Street • Newark 7, N. J.  
America's Pioneer Manufacturer of Rubber-Bonded  
Abrasives

For more data circle 263 on Reader Service Card



# Guard Against Costly Drill "Breakdowns"

## with OLIVER DRILL POINTERS

Don't let inaccurately ground drills and costly drill "breakdowns" tie up production schedules in your plant . . . depend

upon an OLIVER DRILL POINTER to machine grind your drills for lasting accuracy, longer life and reliable performance.

Drills ground the Oliver way cut faster and more accurately . . . produce more perfect holes. Machine ground to a perfect balance, Oliver ground drills are scientifically correct and theoretically perfect—each lip of the drill doing equal work. Drills ground the Oliver way last from 2 to 3 times longer than ordinary hand ground drills.

Keep production schedules operating smoothly . . . eliminate costly product rejects caused by inaccurate drilling . . . at the first sign of dullness remove your drills and machine grind them . . . with an OLIVER DRILL POINTER.

No. 510 for drills  $\frac{1}{4}$ " to 3"—2-3-4 flute. Variable clearances. Variable point angles. Automatic operation.

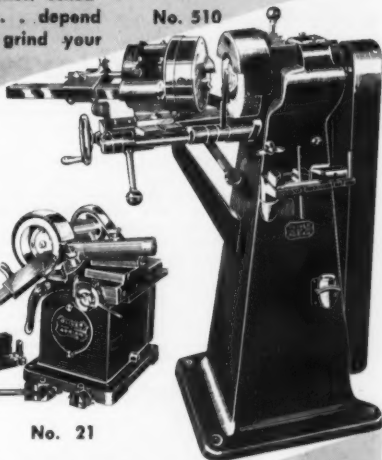
No. 21 Oliver Bench Grinder. Hand operated for Drills No. 57 to  $\frac{1}{2}$ ". Right hand, with an improved point. Attachments are available for grinding oil hole drills, left hand and other special points.

Write for our free Booklet

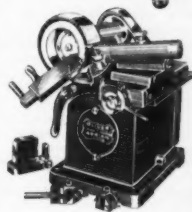
"How To Produce More Holes With Your Drills"

See our catalog in Sweet's Directory

No. 510



No. 21



### MACHINE TOOLS

by OLIVER include:

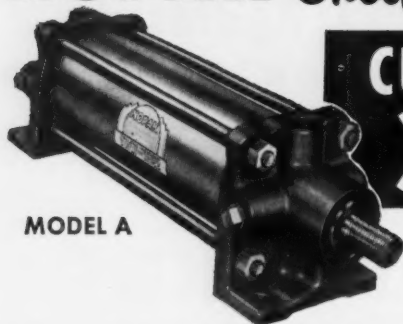
AUTOMATIC DRILL GRINDERS  
TOOL & CUTTER GRINDERS  
DRILL POINT THINNERS  
TEMPLATE TOOL GRINDERS  
FACE MILL GRINDERS  
DIE MAKING MACHINES

## OLIVER INSTRUMENT CO.

1430 E. MAUMEE • ADRIAN, MICHIGAN

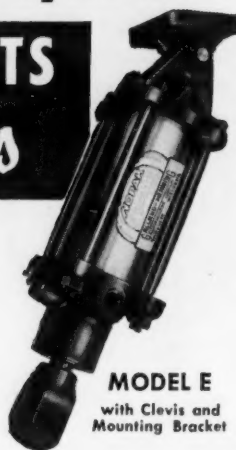
For more data circle 264 on Reader Service Card

# NOPAK Shelf-Stock Cylinders



MODEL A

**CUT COSTS  
3 ways**



MODEL E  
with Clevis and  
Mounting Bracket

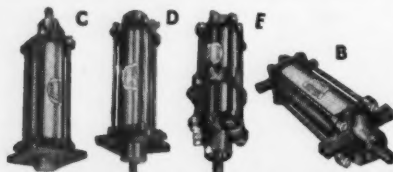
- Low Prices but Top Quality
- No Waiting for "Specials"
- Less Design and Layout Expense

LIST PRICES F.O.B. Milwaukee, Wisconsin (Subject to Revision)

Cyl. Dia. Bore	STOCK STROKE LENGTHS — All Double Acting								
	1"	2"	3"	4"	6"	8"	10"	12"	15"
1 1/8"	24.16	25.72	26.08	26.44	27.16	27.88	28.60	29.32	30.40
2"	26.24	27.88	28.32	28.76	29.64	30.52	31.40	32.28	33.60
2 1/2"	32.36	34.12	34.68	35.24	36.36	37.48	38.60	39.72	41.40
3"	35.04	37.28	37.92	38.56	39.84	41.12	42.40	43.68	45.60
4"	40.84	43.68	44.52	45.36	47.04	48.72	50.40	52.08	54.60
4 1/2"	48.96	51.92	52.88	53.84	55.76	57.68	59.60	61.52	64.40
6"	66.60	70.80	72.20	73.60	76.40	79.20	82.00	84.80	89.00
8"	126.80	129.20	131.60	136.40	141.20	146.00	150.80	158.00	

Compare the prices and scope of NOPAK Shelf-Stock (1 1/2 to 8" bore with 1 to 15" stroke) with competitive offerings and you'll specify these NOPAK Class 1 cylinders to cut costs.

• Basic mountings "A" and "E" (see above) convertible to "B", "C", "D", or "F" (see below) by changing heads. Add 10% to above list prices (no extra charge for 8" bore.) • Piston rods have B-1, NF male thread. • Cushioning can be eliminated on either or both ends by removing spring and ball-check.



Representatives in Principal Cities

NOTE: Class 1 cylinders listed, for Air or Oil to 300 psi. Water use requires 1 week delivery for chrome plating of steel components.

NOPAK 4-Way Valves (1/4 to 2" IPS) hand, foot, solenoid or pilot operated, to actuate all cylinders, also in Shelf-stock.

**GALLAND-HENNING NOPAK DIVISION**  
2758 SOUTH 31st STREET • MILWAUKEE 46, WIS.

**NOPAK**  
**VALVES AND CYLINDERS**  
DESIGNED for AIR and HYDRAULIC SERVICE

For more data circle 265 on Reader Service Card

NOPAK Shelf-Stock also maintained in other principal cities. Write for list.





Supreme Brand Chucks were engineered to outperform everything in the market. Proof of their success can now be drawn from the fact that 34 of the leading power tool makers are now equipping all or an important part of their output with Supreme Chucks.

Best on new equipment . . . best for all replacement use.



*the chuck that lives up to its name ... Supreme*

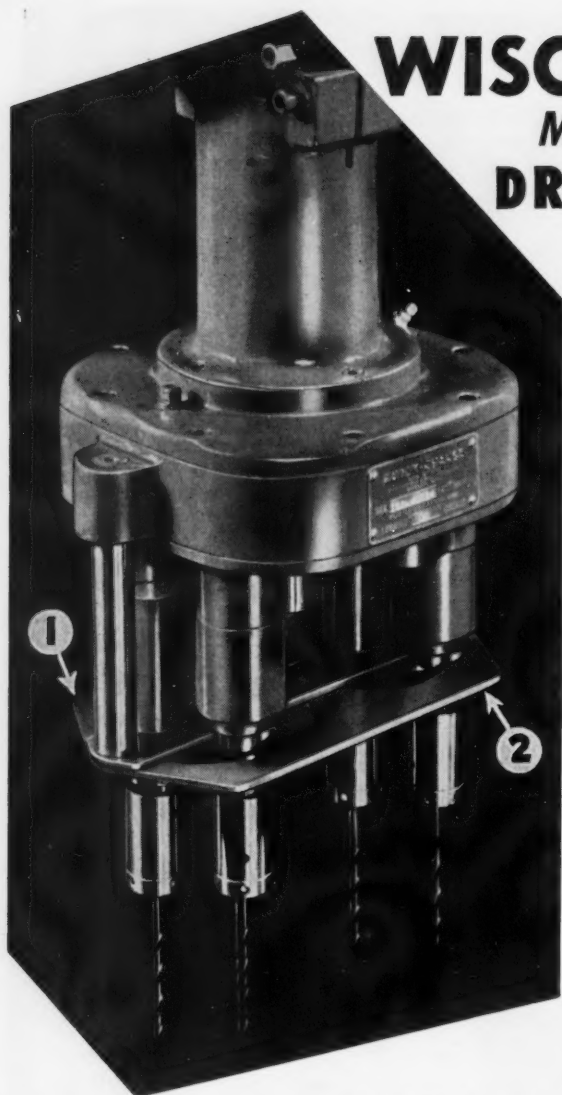


**SUPREME PRODUCTS, INC., 2222 So. Calumet Ave., Chicago 16, Ill.**

For more data circle 266 on Reader Service Card

May, 1955

modern machine shop 67



# WISCONSIN

## Multiple DRILL HEADS

### Adjustable and Fixed-Spindle Types

Adjustable Spindle Heads have Dual Positioning Plates for fast, accurate set-ups that "stay put".

Positioning and Locking Templates are furnished for each bolt circle or hole pattern . . . to your exact specifications.

Half-hole Positioning Plates (1) make it easy to swing spindles into place quickly. Locking Plates (2), with full holes, are mounted on support posts to lock set-ups securely against shifting.

6 Capacity Ranges . . . from "Light Duty" to "Extra Heavy Duty". Standard Models have 2 to 8 spindles. Special Models built to order.

1. Half-hole Positioning Plate.

2. Locking Plate has full holes to hold spindles in place.

Send print of Hole Pattern for estimate.

## WISCONSIN DRILL HEAD CO.

4983 N. 124TH STREET

BUTLER, WISCONSIN

For more data circle 267 on Reader Service Card

# SANFORD

## SURFACE GRINDER

### MODEL MG

**For Dry or Wet\* Grinding!**  
**PRECISION • SPEED • SENSITIVITY**

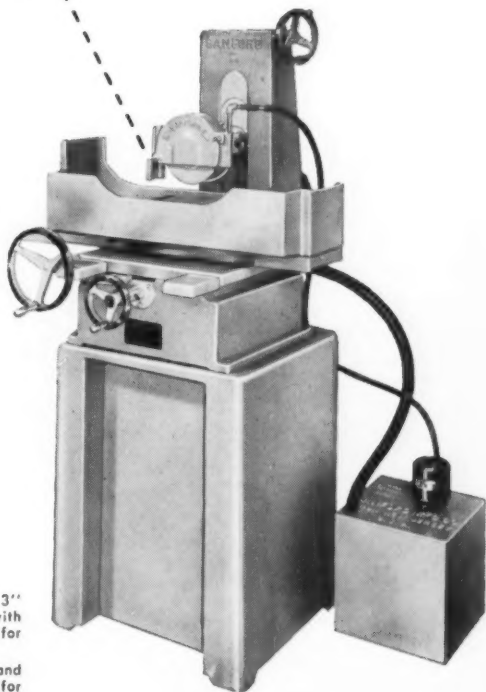
Built by manufacturers who concentrate on small grinders only, each Sanford Grinder is an individual project of time tested and proved basic design. Although modest in price, no quality undermining shortcuts are employed to reduce manufacturing costs. Constant repeat orders prove its acceptance.

This sensitive machine grinds to micro-inch accuracy with no vibration, with maximum dimensional stability. Here's why:

- Transverse ways are double Vee (VV) Mechanite inserts instead of flat surfaces which depend upon unstable jibs for alignment and accuracy.
- Needle, Ball and Oilite Anti-Friction bearings are used throughout.
- Alignments are electronically checked for accuracy.
- Precision slides are ground, lapped and hand spotted.
- Dials are large and legible.

**SPECIFICATIONS** — 8 $\frac{3}{4}$ " transverse — 13" longitudinal — 12" vertical under 7" wheel with Adapter. Approximate weight 630 lbs. Send for illustrated bulletin.

Replacement parts, special attachments and reconditioning facilities are available. Send for price list.



# SANFORD

## MANUFACTURING CORP.

1022 Commerce Ave., Union, N. J.

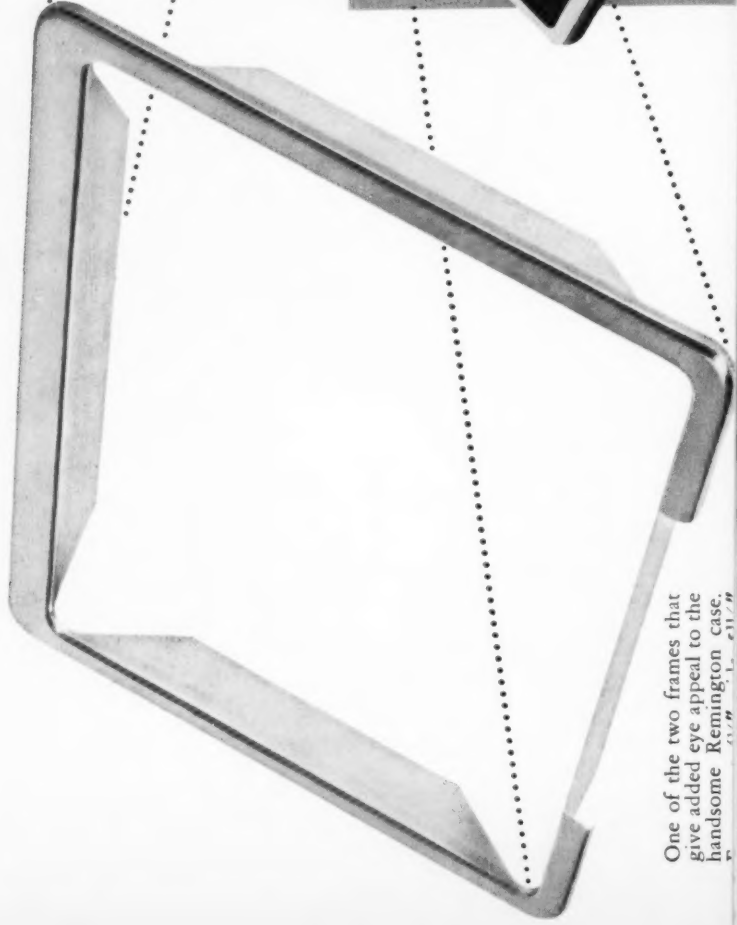
For more data circle 268 on Reader Service Card

May, 1955

modern machine shop 68a

# Rejects dropped from 11% to 1%

when Farrington switched to Formbrite for  
frames of Remington Shaver case



One of the two frames that  
give added eye appeal to the  
handsome Remington case.

© 1974 Remington Co., Inc.

## Formbrite\* fine-grain drawing brass is harder, stronger, springier...often polishes in half the time

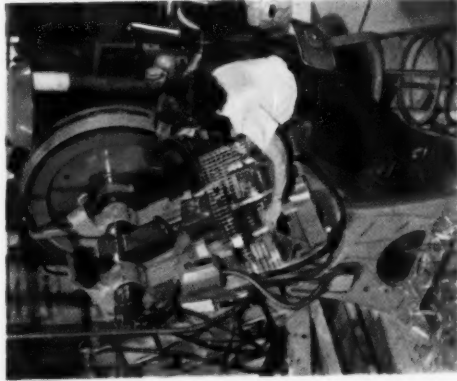
Each day, thousands of these brass frames for the Remington-60 Deluxe Shaver case are made by Farrington Manufacturing Company of Boston. Using ordinary brass, rejects *after polishing* were running at the rate of 11%.

Then Farrington switched to Formbrite. Rejects dropped immediately to less than 1% . . . and with far less polishing Farrington now gets the best finish they've ever seen. And that's important because the Remington case helps sell the shaver.

You'll find Formbrite surprisingly ductile . . . it's readily stamped, formed, drawn and embossed. Yet with all its advantages, it costs no more than ordinary drawing brass. We'd like you to know this cost-saving metal better. May we send you descriptive literature (ask for booklet B-39)? A free sample to try in your own shop? Or have a representative call? Simply write to *The American Brass Company, General Offices, Waterbury 20, Conn.* In Canada: *Anaconda American Brass Ltd., New Toronto, Ontario.*

\*Reg. U. S. Pat. Off.

5577



Press operator blanks frames for the Remington case out of 6" x .0126" Formbrite drawing brass strip.



Frames are set in fixture for finishing operation on this automatic, three-station polishing machine. Bright, lustrous finish is obtained in one pass through the machine.

# Formbrite

FINE-GRAIN DRAWING BRASS

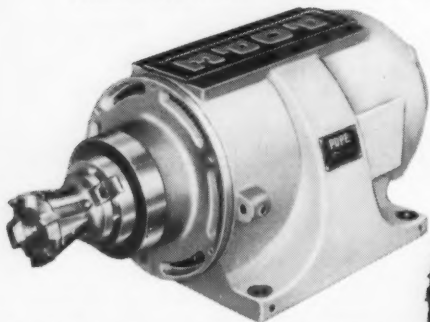
AN **ANACONDA**<sup>®</sup> PRODUCT  
made by The American Brass Company



You Can *Specify*  
**POPE HEAVY DUTY  
WHEEL HEAD SPINDLES**  
With Confidence

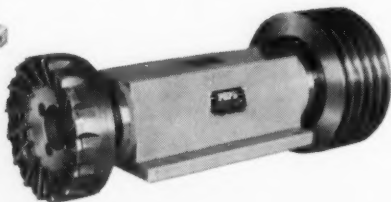
POPE Spindles like these are designed for a wide variety of applications including grinding, boring, milling, drilling and many other operations requiring **PRECISION COMBINED WITH RUGGEDNESS.**

For continuous production and trouble-free operation  
**THERE'S NOTHING LIKE A POPE SPINDLE WITH ROLLER BEARINGS**



P-12007 Heavy Duty Belt Driven Milling Spindle, in sizes from 1 to 50 HP. Available with standard No. 30, 40, 50 or 60 milling machine noses.

◀ P-2565 Heavy Duty, Totally Enclosed, Fan Cooled, Motorized Milling Spindle in sizes from 1 to 30 HP, 600 to 3600 RPM, 220-440 or 550 volts, 3 phase, 60 cycle (other electrical specifications available.)



SEND US YOUR SPECIFICATIONS AND LET OUR ENGINEERS RECOMMEND  
THE SPINDLE FOR THE JOB YOU ARE GOING TO DO

No. 99

*Specify*

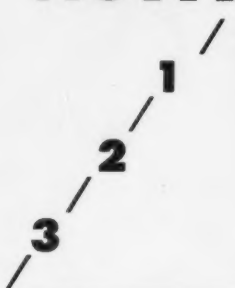
**POPE**  
PRECISION SPINDLES

POPE MACHINERY CORPORATION  
Established 1920  
261 RIVER STREET • HAVERHILL, MASSACHUSETTS

For more data circle 271 on Reader Service Card



# EASY AS ---



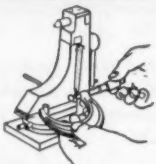
Measure over diamond point to back of micrometer plate.

①



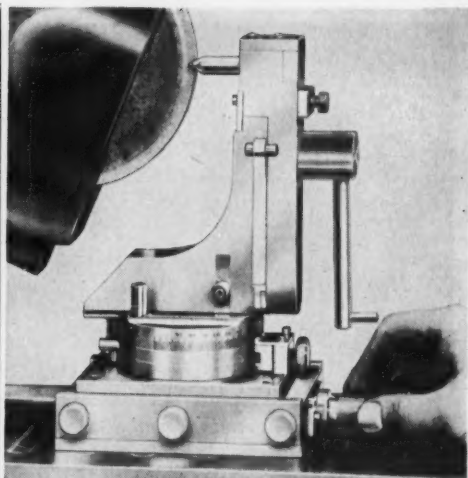
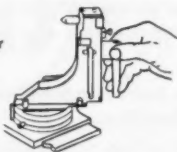
Add required convex radius or Subtract required concave radius.

②



Tighten gib. Dresser ready for action.

③



YOU CAN DRESS WHEELS UP TO 24" IN DIAMETER WITH J & S "FLUIDMOTION" WHEEL DRESSERS. MODEL REC SHOWN HERE.

## The J&S "Fluidmotion" Wheel Dresser

The J & S "Fluidmotion" Wheel Dresser can be set in seconds to dress any angle. Complex concavities or convex shapes can be set in a few minutes.

Fully adjustable with swivel base and patented "Fluidmotion", there is no other method that gives you the "precision flexibility" and ease of dressing simple or complicated shapes and contours.

Write for fully illustrated literature that shows in detail the wide adaptability of the "Fluidmotion" Dresser for just about any wheel dressing job. It comes in several sizes that will dress wheels ranging from the smallest up to 24-inch diameter.

The only "radius tangent to angle" dresser.



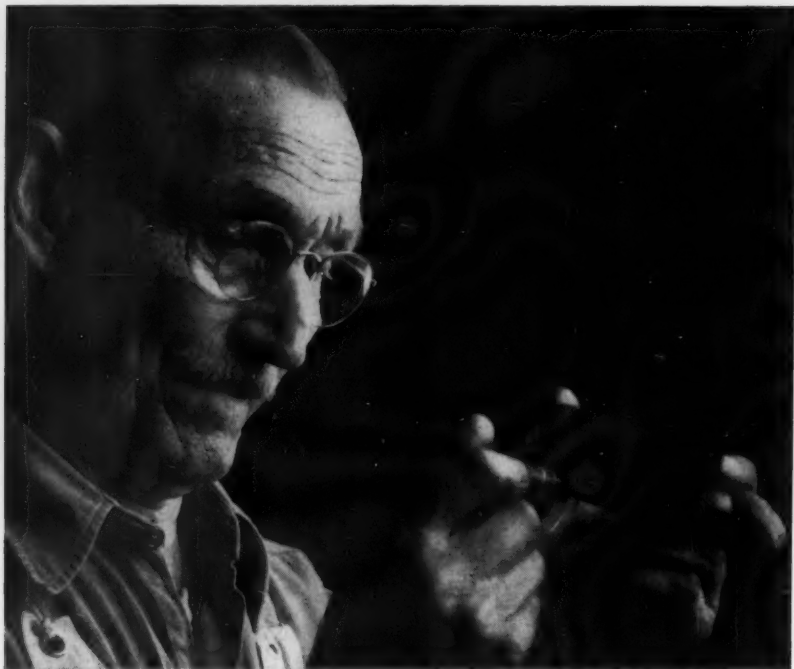
WHEEL DRESSERS • JAW CLAMPS • PRECISION VISES • SINE BARS • DOWN-HOLDING DEVICES

REPRESENTATIVES IN PRINCIPAL CITIES

# J&S TOOL CO., INC.

871 DORSA AVENUE • LIVINGSTON, NEW JERSEY

For more data circle 272 on Reader Service Card



I've been making tools for wire and ribbon metal forms long enough to know that A. H. Nilson Fourslides are the most adaptable and produce parts most economically. For easy set-up and tool adjustment, accurate feed, and rugged design . . . Nilson Fourslides are my choice.

Look at the part shown on the left . . . made in our Nilson #S-O Fourslide. Better than 5,000 of these are produced per hour automatically from coiled stock using .039 dia. tin-plated copper wire, and this tops any previous production method.

I'd suggest you contact Nilson yourself and learn how you can increase production and lower costs with Nilson automatic Fourslides.



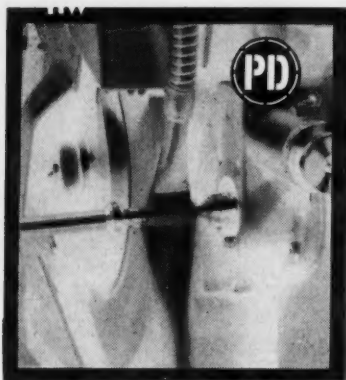
Actual Size



1514 RAILROAD AVENUE, BRIDGEPORT 5, CONN.

Automatic Chain Making Machines : Staple Forming Machines : Wire and Stock Reels : Wire Straightening Equipment : Slide Feeds for Presses

For more data circle 273 on Reader Service Card



**Save money and increase production through this remarkable development..**

◀ JUST AS A NEGATIVE guarantees you an exact duplication of a photograph each and every time, you are always assured a . . .

. . . POSITIVE DUPLICATION of an original grinding wheel each and every time through the CINCINNATI (PD) Manufacturing Process.

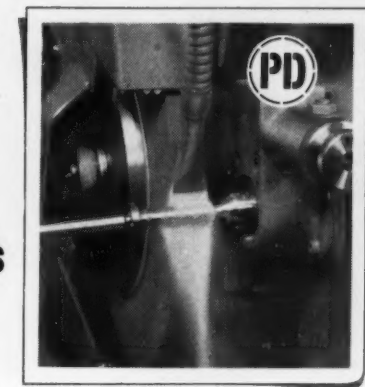
**NOW!**  
**Cincinnati Grinding Wheels**  
**offer**



**Positive Duplication**

Positive Duplication is an achievement in precision manufacturing and quality control that absolutely can *save you money and increase your production.*

Through the CINCINNATI (PD) Manufacturing Process you are assured a Positive Duplication of the original wheel *every time* you reorder. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike, yet are priced *no higher than ordinary wheels.*



For full information, write, wire or telephone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.



For more data circle 274 on Reader Service Card

# Now you can make WELDED TUBES

*faster, better, at lower cost, from -*

STEEL

STAINLESS

BRASS

COPPER ALLOY

ALUMINUM

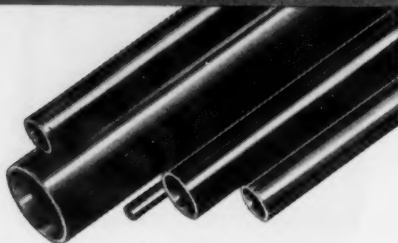
MAGNESIUM

NICKEL

INCONEL

MONEL

NO



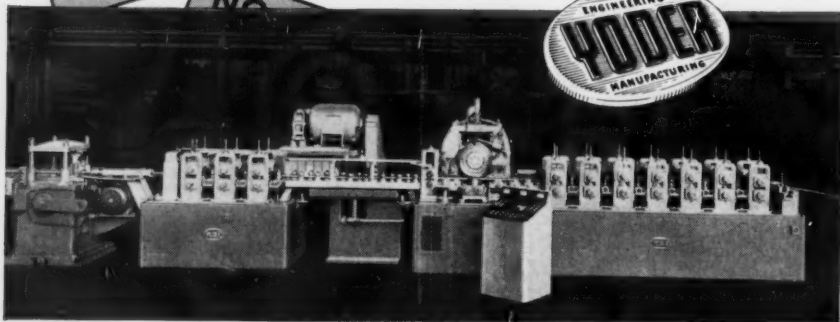
Within the last few years rapid strides have been made by Yoder in widening the scope and raising the speed of cold process electric-weld pipe and tube making. In tube mills perfected by Yoder many non-ferrous metals can be induction-welded in gauges up to .154" and at speeds approaching those attained in resistance welding steel tubes.

Further, speeds up to 250 fpm are reached in induction-welding steel tubing in the same gauges.

New, compact Yoder "4-in-1" Welding Transformer is the last word in resistance-welding steel pipe and tubing in sizes up to 24" dia.

More specific information, literature and estimates on request, without obligation on your part.

**THE YODER COMPANY**  
5532 Walworth Ave. • Cleveland 2, Ohio



For more data circle 275 on Reader Service Card



rolling action  
is designed  
right in



~~ROLLING FILE ITSELF IS ELIMINATED~~



## HELLER *spiral-cut* half round files



A NEW JERSEY CORP.

VIXEN *American-Swiss* NUCUT  
FAMOUS BRANDS MADE ONLY BY

**Smooth, even finishes** are easier with Heller Spiral-Cut Half Round Files. Ordinary half round files require a skillful twisting. Heller engineering has removed this human element from good file performance. The necessary rolling action is designed right into the Heller Spiral-Cut Half Round File. This new cutting principal is typical of Heller's continuous search for better files. By constantly testing, inspecting, improving . . . Heller guarantees file users "the best."

### HELLER BROTHERS COMPANY

*America's Oldest File Manufacturer*

BRANCH OFFICES: New York Chicago Detroit

NEWCOMERSTOWN, OHIO

**YOUR HELLER DISTRIBUTOR CAN SUPPLY ALL YOUR FILE NEEDS**

For more data circle 276 on Reader Service Card

**FROM**



## **1. 4-PURPOSE PRECISION PANTOGRAPH**

The "*Panto-Miller*"

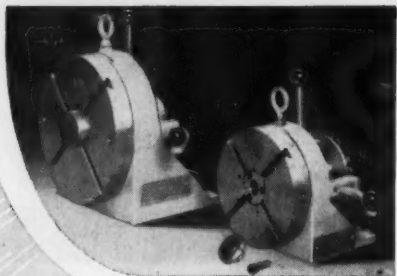
- Engraves
- Profiles
- Die Cuts
- Mills

A sturdy, production tool for 2-dimensional cutting in steel, cast iron, non-ferrous metals and plastics.

Pantograph reductions from 1:1 to 1:40. Spindle speeds infinitely variable from 1,200 to 11,500 RPM without belt changing.

Extreme accuracy and freedom of motion. Write for "*Panto-Miller*" details.

**JOHNSON & BASSETT, INC.** *Production Tool Div.*  
BOX 1251, WORCESTER, MASSACHUSETTS, U. S. A.



## **2. RAPID, ACCURATE JIG POSITIONING**

This indexing trunnion, with station selector, accurately holds and locates either jig or work. SIMPLIFIES JIGS. REDUCES SET-UP TIME.

Ask for "*TRUNNION*" information





Every practical shape  
and size

...plus every practical  
degree of fineness  
(00 to 6)...plus

the craftsmanship  
of specialists  
in

Swiss Pattern  
file cutting exclusively...

**...THESE MAKE NICHOLSON X.F. (EXTRA FINE)  
THE LARGEST-SELLING BRAND OF  
ITS KIND IN AMERICA**

Toward achieving accuracy in precision work, the first rule of the tool, die, model and fine-instrument crafts is to use files which in themselves are precisely made, carefully hardened, uniformly correct and efficient.

*Individual types include:* Knife, Round Straight, Half Round, Metal Saw, Square, Pillar Narrow, Three Square,

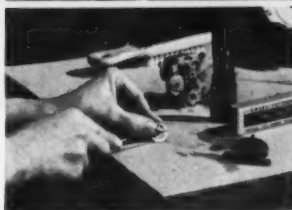
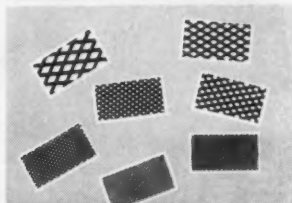
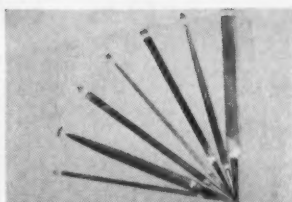
Equaling, Round Tapered, Hand, Warding, Crochet, Barrette, Slitting, Crossing, Joint, Pippin, Testing.

*Group assortments:* Die Sinkers, Die Sinkers Riffers, Bench Filing Machine, Broach; Round and Square Handle Needle (in 1-dozen plastic-case assortments if desired).

*Consult and buy from your Industrial Distributor*



**NICHOLSON FILE CO., 48 Acorn St., Providence 1, R. I.**  
(In Canada: Nicholson File Company of Canada Ltd., Port Hope, Ontario)



**NICHOLSON FILES** FOR EVERY PURPOSE

For more data circle 278 on Reader Service Card

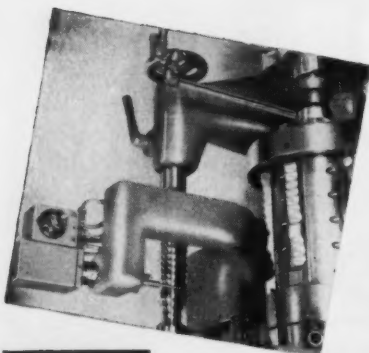
May, 1955

modern machine shop 75

**SAVED!**  
1 HOUR AND  
55 MINUTES  
PER PIECE

IN PRODUCTION  
TIME-COSTS

**SIDNEY FLUID  
TRACER TIME  
ONLY 10 MINUTES**



From round or flat templates or regular lathe work without limiting range.



**RUGGED..**

Built to take continuous intermittent cutting with amazing savings on pieces as illustrated. Get the "inside story"—write direct or contact nearest SIDNEY representative.

**SIDNEY** HEAVY-DUTY  
LATHES

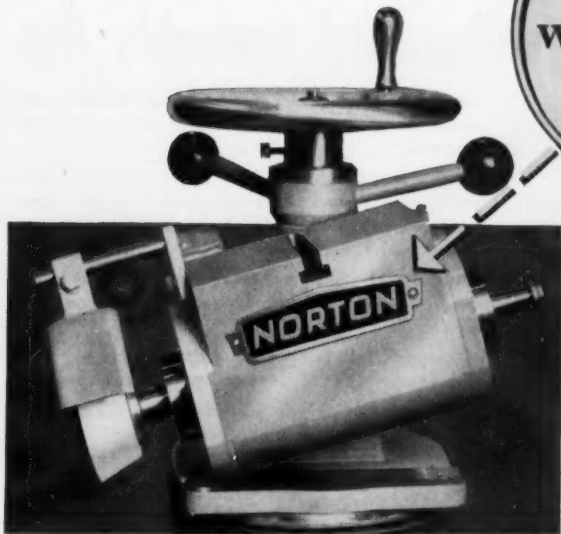
SIDNEY MACHINE TOOL COMPANY • SIDNEY, OHIO  
BUILDERS OF PRECISION MACHINERY SINCE 1902

For more data circle 279 on Reader Service Card

# No other cutter and tool grinder does...

*so many jobs so fast,  
so easily, as the  
Norton No. 20, because...*

the  
wheel head  
tilts!



## ***Greater versatility featured!***

The Norton No. 20 cutter and tool grinder brings new speed and economy to the widest range of tool and cutter grinding jobs. It adds value to every piece of work it grinds... brings you more speed, more product value, more profit.

The wheel head can be tilted up to 15° above or below horizontal, and swivelled through 360°—simplifying such ordinarily difficult jobs as grinding taper reamers, step counterbores, form tools and milling cutters.

Other pace-setting advantages that make this Norton cutter and tool grinder easier to set up and more profitable to operate include: long table traverse and wheel slide travel... integral motor spindle... centrally located column elevating hand wheel... wheel slide graduated dials readable from any position... automatically lubricated table ways... electric equipment built to Machine Tool Builders' standards.

Only one of the world's most complete line of grinding machines, the No. 20 is a typical development of Norton's engineering leadership. Remember—only Norton offers you such long experience in both grind-

ing machines and wheels to help you produce more at lower cost.

Why not investigate how the No. 20 can modernize and speed up tool and cutter grinding in your plant? See your Norton Representative for detailed information—and ask him about Norton cutter and tool grinders Nos. 1 and 2, and the BURA-WAY Grinder for automatic lathe tools. Meanwhile, write direct for Catalog 189, NORTON COMPANY, MACHINE DIVISION, Worcester 6, Mass. In Canada: J. H. Ryder Machinery Co., Ltd., Toronto 5.

**To Economize, Modernize with NEW**

**NORTON**

**GRINDERS and LAPPERS**

*Making better products... to make other products better*

District Sales Offices:

Hartford • New York • Cleveland • Chicago • Detroit

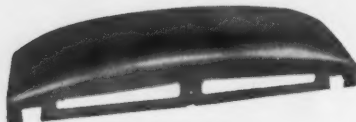
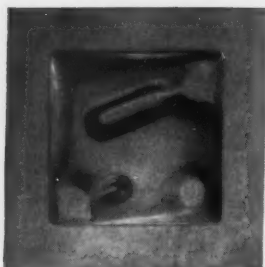
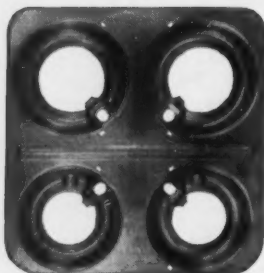
For more data circle 280 on Reader Service Card

May, 1955

modern machine shop 77



## Plastic Low Cost Tooling For Dies... Drill, Welding, and Assembly Jigs



*Vulcan, keeping pace with modern tooling, can recommend plastic tooling for medium production on numerous tool programs.*

Plastic tools are light in weight, have good impact, compressive strength and dimensional stability. No hand finishing of parts required as galling or marking is eliminated by using plastic form dies.

Contours and odd shapes are cast or laminated to suit individual tools, saving expensive machine and hand finishing operations.

Plastic tools, built in a matter of days instead of weeks, lower your tool costs for those medium production runs.

Our actual production figures prove plastic has a definite place in modern production.

Vulcan Tool Company's organization, building fine tools since 1916, believes new tooling developments must be proved by tool engineers. Since plastic is not a cure-all your problem should be handled by recognized, practical tool men.

Our engineering staff will recommend the correct plastic material and advise if parts of your tooling program should be in plastic.

*Send a part print and your production requirements for quotation and recommendations.*

**Major Vulcan Services** . . . Engineering, Processing, Designing and Building . . . Special Tools . . . Dies . . . Special Machines . . . Vulcamatic Transfer Machines . . . Automation . . . including the Vulcan Hydraulics that Form, Pierce, Assemble and size. Vulcanaire Jig Grinders . . . Motorized Rotary Tables . . . Plastic Tooling.

## VULCAN TOOL CO....PLASTIC TOOL DIVISION

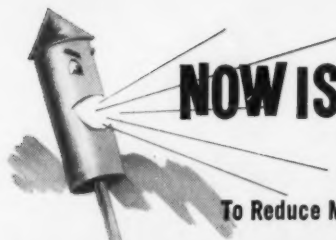
727 LORAIN

DAYTON, OHIO

For more data circle 281 on Reader Service Card

78 modern machine shop

May, 1955



# NOW IS THE TIME . . . and here is the way !

To Reduce Manufacturing Costs with a . . .

This revolutionary new design of vertical turret lathe has exclusive features never before offered on machines of this type . . . takes full advantage of the latest improvements in cutting tools and methods . . . truly the machine with a "built-in" future.



## CUT MASTER VERTICAL TURRET LATHE

. . . Model 75

AVAILABLE IN 26, 36, 46,  
56, 66, AND 76 INCH  
SIZES

### PENDANT CONTROL . . .

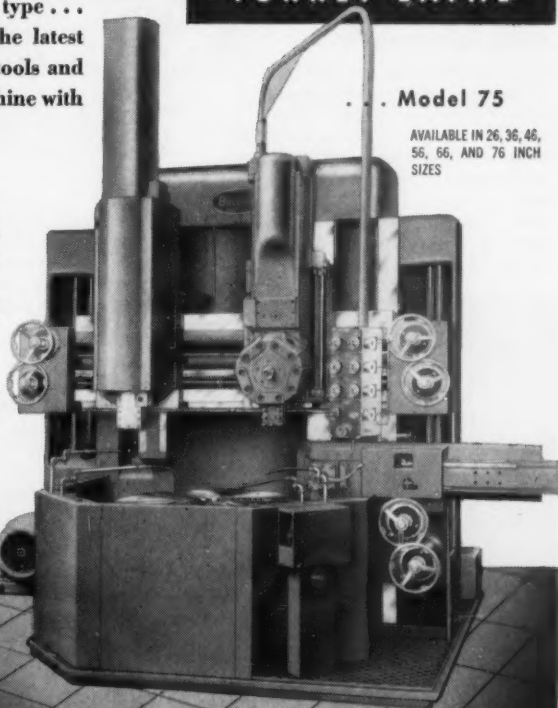
provides maximum machine control from a movable pendant station. Start and stop spindle; selection of speeds, feeds and directional movement of all heads in feed or traverse are quickly and easily accomplished from the Pendant. Interlocks and a stopall stick provide safety for both operator and machine.

### SCREW FEED . . .

is provided for vertical and horizontal motion of all heads—to assure fine, smooth finishes with greater accuracy.

### POWER INDEXED MAIN TURRET . . .

(Optional) Five sided turret for "run of the mill" jobs. Four sided turret for production jobs.

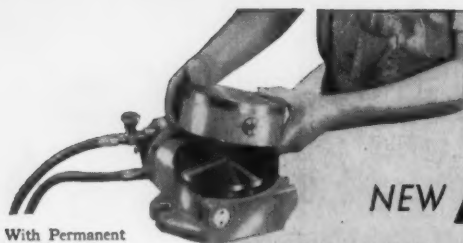


PLAN TO SEE OUR  
TURRET AT . . .

THE  
BULLARD TOOL  
COMPANY  
BIDGEPORT, CT.

WE INVITE YOUR INQUIRIES—CALL OR WRITE  
YOUR NEAREST BULLARD SALES OFFICE, DISTRIBUTOR OR  
**THE BULLARD COMPANY**  
BRIDGEPORT 2, CONNECTICUT

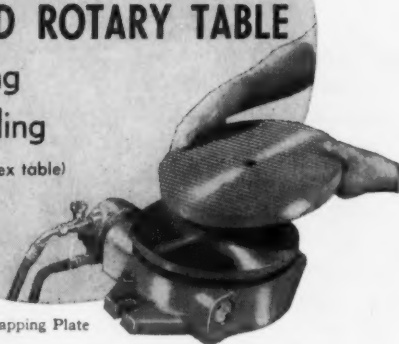
For more data circle 282 on Reader Service Card



With Permanent  
Magnetic Chuck

## NEW *Vulcan* MOTORIZED ROTARY TABLE for lapping and grinding

(not an index table)



With Lapping Plate

### FASTER

circular precision grinding!

Now with this table and with less effort you assure highest standards of accuracy, flatness, finish and close tolerances. At the same time you eliminate slow and complicated tool setups. You cut grinding time greatly by using only cross feed while the table is rotating at infinite speeds between 40 and 100 RPM.



Work clamped to motorized  
table, mounted on sine plate.  
Surface grinder application.

For example, Vulcan's Rotary Table can be used in connection with a sine plate or angle fixture. The dressing of large expensive external wheels for side grinding is therefore eliminated. If you wish we can provide permanent magnetic chucks designed for use with our table, both 6" and 10" in diameter.

Vulcan's Rotary Table is an air operated, self contained unit, portable between bench or machine. A precision center hole for locating and tapped holes in the table for clamping provides easy setup. Circular surface grinder applications are many and varied — grind flanged studs or bushings — bearing spacers — forming rolls — cutters — convex or concave surfaces — punches or dies (radius or angle).

Lapping? Yes — and in micro inches. For the 6" and 10" table, lapping plates of 12" and 16" are provided. Perfect for lapping valve plates, gages, bearing spacers and for carbide lapping using diamond powder. Write for circular.

### Major Vulcan Services

Engineering, Processing, Designing and Building . . . Special Tools . . .  
Dies . . . Special Machines . . . Vulcamatic Transfer Machines . . .  
Automation . . . including the Vulcan Hydraulics that Form, Pierce,  
Assemble and size. Vulcanaire Jig Grinders . . . Motorized Rotary  
Tables . . . Plastic Tooling.

**VULCAN TOOL CO.**

720 LORAIN

DAYTON, OHIO

For more data circle 283 on Reader Service Card



OPR  
CV 389  
OK  
CV 389 CA PLS

*URGENT*  
*re: Cimcut base additive*  
*read-initial-pass on*

CINCINNATI MILLING PRODUCTS DIVISION CALLING. HIGHLY IMPORTANT ALL PLANTS USING CUTTING OILS BE INFORMED OF OUR DEVELOPMENT OF CIMCUT BASE ADDITIVE, WHICH IMPROVES TOOL LIFE, GIVES BETTER FINISH, INCREASES PRODUCTION, YET LOWERS COSTS.

CIMCUT BASE ADDITIVE IS A SULPHUR CHLORINATED OIL ADDITIVE -- CONTAINING VERY EFFECTIVE E. P. AND POLAR LUBRICATING PROPERTIES -- AND IS BLENDED IN VARIOUS DILUTIONS WITH MINERAL OILS. THUS, CAN BE USED FOR A GENERAL ALL PURPOSE CUTTING OIL.

CIMCUT BASE ADDITIVE HAS MANY OUTSTANDING ADVANTAGES, PERMITS INCREASED PRODUCTION -- AND GIVES IMPROVED TOOL LIFE AND BETTER FINISH AT HIGHER FEEDS AND SPEEDS. BECAUSE OF ITS E. P. AND POLAR FRICTION REDUCING PROPERTIES, IT LUBRICATES THE CUTTING TOOL FOR COOLER CHIP. BY REDUCING FRICTION BETWEEN CHIP AND TOOL, LESS HEAT IS GENERATED, LONGER TOOL LIFE OBTAINED, AND FINISH GREATLY IMPROVED. DOES NOT ALTER STRAW COLOR OF MINERAL OIL. DOES NOT HAVE AN OBNOXIOUS SULPHUR ODOR.

SAVES MONEY. COSTS LESS PER GALLON IN THE MACHINE THAN CONVENTIONAL PRE-BLENDED CUTTING OILS. HAS LOWER FINAL COST BECAUSE OF BETTER PERFORMANCE, REQUIRES NO SPECIAL BLENDING APPARATUS, AND MAY BE UTILIZED TO CONVERT USED OILS TO CUTTING OIL.

PLEASE INFORM ALL PLANTS OF CIMCUT BASE ADDITIVE AS QUICKLY AS POSSIBLE.

END OR CAP

OK. WILL RELAY MSG IMMEDIATELY.

END V

*RB* *32*  
*WJ* *ARL* *JLH*  
*COA* *RAC-EX* *ccc*

**CIMCOOL**  
Cutting Fluids

100%  
for ~~85%~~ of all metal cutting jobs

PRODUCTION PROVED PRODUCTS OF THE CINCINNATI MILLING MACHINE CO.

# Tough grinding jobs?

Check **Vulcanaire**  
high speed precision  
grinding heads!

Many seemingly impossible grinding problems have been solved by adapting Vulcanaire to standard machines or by using one of Vulcan's specially designed machines.

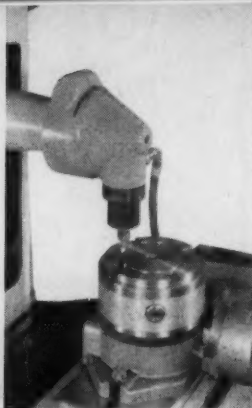
On Surface Grinders, merely remove wheel and guard, clamp vertical or horizontal adaptor to machine as illustrated. No belts necessary. For instance, Vulcanaire used in connection with Vulcan's Rotary Table for Surface Grinders permits the grinding of a circular slot.

Adaptors are in stock to fit the spindle of Vertical Milling Machines for grinding contours, holes and slots.

On Internal Grinding Machines Vulcanaire's infinitely controlled speeds furnish the correct surface cutting speed resulting in faster production and micro finish. The adaptor sleeve fits into present housing.

Applied to Jig Boring Machines, Vulcanaire is liked by leading precision manufacturers because its accuracy is guaranteed, producing Vulcanaire jig grinding of large and small parts.

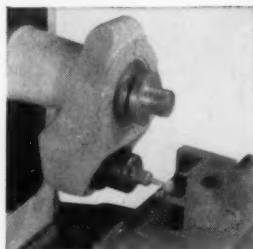
*Send us a blue print on your toughest grinding problem. Recommendations and sketches will be returned to you — no obligation.*



Grinding circular slot using Vulcan's Rotary Table and Magnetic chuck.



Vertical adaptor for Surface Grinders. Grinding small slots



Horizontal application Grinding a Shoulder Punch.

## Major Vulcan Services

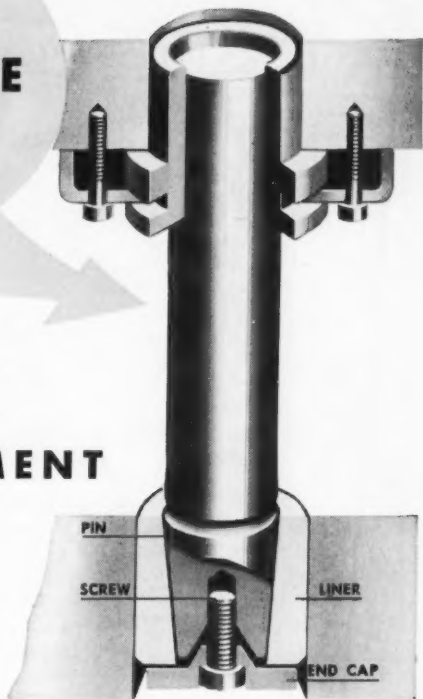
Engineering, Processing, Designing and Building . . . Special Tools . . . Dies . . . Special Machines . . . Vulcamatic Transfer Machines . . . Automation . . . including the Vulcan Hydraulics that Form, Pierce, Assemble and size. Vulcanaire Jig Grinders . . . Motorized Rotary Tables . . . Plastic Tooling.

**REMOVE...  
INTERCHANGE**  
*Lamina*

**GUIDE PINS**  
... and still maintain  
**PERFECT ALIGNMENT**

Lamina removable guide pins were developed to save time and expense ... designed for easy removal, simple replacement and to maintain perfect alignment even if the pins are interchanged.

Now, to sharpen the die or make design changes, you simply remove the screw and end cap, then take out the pin—without damaging the die shoe. You can replace Lamina pins in any hole, in any position. Self-locking, matching tapers on the pin and hardened bushing liner plus perfect concentricity between the taper and the pin bearing surface assure an exact fit and precision alignment every time. Made in three styles—removable, shoulder and straight—Lamina pins are perfect running mates for the famous Lamina guide pin bushings. Prices and dimensions of these outstanding products are clearly shown in our new catalog. See your die set manufacturer or write direct to us for your free copy.



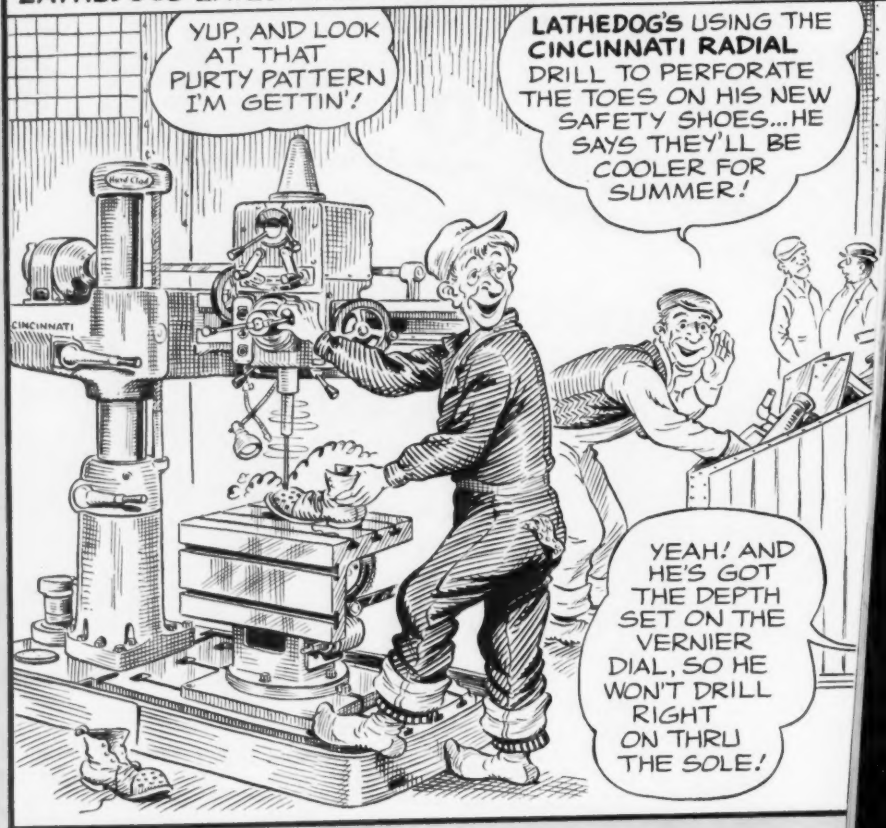
*Lamina*

**DIES AND TOOLS, INC.**

P.O. BOX 31, ROYAL OAK, MICHIGAN

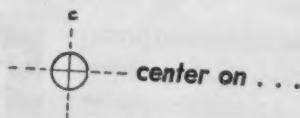
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# "LATHEDOG'S" LATEST WAY TO USE THE CINCINNATI RADIAL DRILL



THE  
MACHINE TOOL  
SHOW  
CHICAGO, ILL.  
SEPT. 8-17, 1955  
INTERNATIONAL AMPHITHEATRE

BOOTH NO. 309



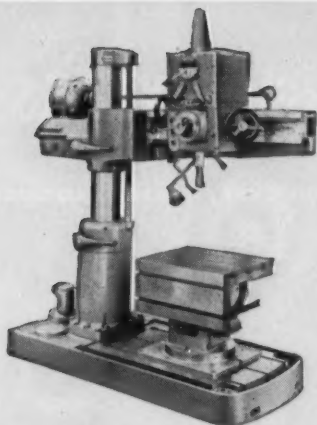
## cincinnati

**J.R.WILLIAMS**

AT 2330  
R.P.M.  
HE GOES  
RIGHT  
THRU  
THAT  
CAP  
LIKE  
BUTTER!



Large-size prints of this  
J. R. Williams cartoon are  
available.



The Cincinnati 3' 7 1/2" Radial Drill is built around a new Hard-clad column designed for enduring accuracy. Centrifugally cast from high-density iron, Flamatic hardened and ground to close tolerance, this new column provides extreme wear resistance and retains its precision through long service. Operation is easier, too, with speeds and feeds both selected on Cincinnati's exclusive Color Match dials. Drilling capacity of 1 1/4", plus a long list of special features, makes a Cincinnati Radial your best buy for the majority of your drilling jobs.

1. Unit construction throughout
2. Hardened alloy steel gears in feed and speed transmissions
3. Hardened and ground headrail on arm
4. All geared head—forced-spray lubrication
5. 9 spindle speeds
6. Self-contained feed transmission
7. 6 spindle power feeds
8. Multiple-disc clutches for spindle drive
9. Positive jaw feed clutch
10. Universal or box-type tables and right and left-side bases available

11. Free service manual and parts list *delivered with machine*  
Cincinnati also makes a complete line of Tray-Top lathes, light-duty floor and bench-type drills.

Get complete catalogs and the name of your local dealer by writing on your company letterhead to Cincinnati Lathe and Tool Co., 3262 Disney, Cincinnati 9, Ohio.

# lathes and drills



For more data circle 288 on Reader Service Card

May, 1955

modern machine shop 85

# IT'S THE NEW, "YEARS-AHEAD" LINE ...

*Far out front on every point of comparison*



COMPLETE LINE FROM 50 TO 775 TONS



*America's Most Complete Line of Presses, Shears, Machines and Tools for Plate and Sheet Metal Work*



# ... NIAGARA

## ALL STEEL PRESS BRAKES

### "MULTI-MACHINE" VERSATILITY TO BOOST PRODUCTION

Practically limitless in their scope of forming, bending, punching, blanking and related operations, Niagara Press Brakes get more done for you because they do more jobs. One reason: Advanced design. Another: The extensive line of Niagara Press Brake Dies available.

### UNIFORM BENDS WITH STRAIGHT- EDGE ACCURACY

Double end twin drives with double reduction gearing, on all models, provide uniform, constant application of power at both ends of the ram. Off-center loading presents no problem.

Rugged, streamlined frames feature box type crowns of unequaled strength and rigidity, assuring maximum resistance to deflection and permanent alignment of bearings and ram.

### 3-SHIFT STAMINA TO HANDLE WORK-HEAVY SCHEDULES

Close attention has been given to every design detail. Nothing has been overlooked. Each frame size has been scientifically tested to detect and eliminate harmful stresses at all critical points.

Laminated non-metallic ways, an exclusive Niagara feature, reduce wear to an absolute minimum, providing accurate alignment and longest possible service life. All gearing is totally enclosed in sealed oil baths for thorough, clean lubrication.

Once again, Niagara's forward-thinking engineering has produced a metal working machine years ahead of its time. As you become familiar with the significant developments embodied in this revolutionary new line of all steel press brakes, you will realize why it carries the Niagara nameplate. After all, who is more uniquely qualified to be its builder than the builder of America's most famed and most complete line of presses, shears, other machines and tools for plate and sheet metal work?

Call in your nearest Niagara representative at once. Let him tell you, in detail, what these great, new press brakes can do for you.

### CHECK ALL THE FACTS, YOURSELF!

Compare. Make a careful, feature-by-feature appraisal of Niagara's years-ahead press brake design. Write for new Bulletin 89C . . . the most comprehensive press brake literature ever published.

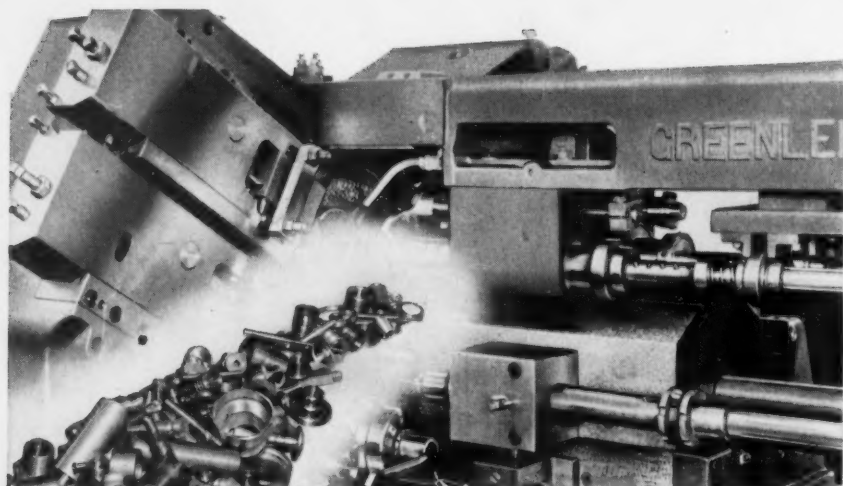


### NIAGARA MACHINE & TOOL WORKS BUFFALO 11, N. Y.

DISTRICT OFFICES:

Buffalo, Cleveland, Detroit, New York, Philadelphia  
Dealers in principal U. S. cities and major foreign countries

**engineered to expand your output  
...AT SAVINGS!**



## PRODUCTION VERSATILITY

### ON A GREENLEE 6-SPINDLE AUTOMATIC BAR MACHINE

Greenlee Automatics provide accurate and fast production of an almost endless range of parts.

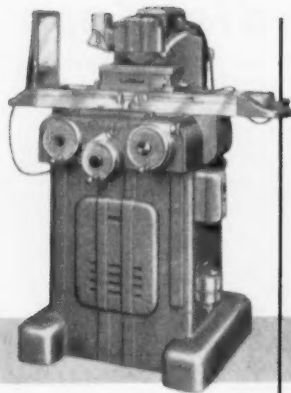
Standardized tooling, wide open tooling area, interchangeable cross-slide cams, built-in threading drive, rapid stroke-setting and other Greenlee advantages provide great versatility, assure a quick and generous return on your equipment investment.

PHONE  
ROCKFORD 3-4881  
TO HELP SOLVE YOUR  
PRODUCTION PROBLEMS

PRODUCTION MACHINERY  
**GREENLEE**  
GREENLEE  
BROS. & CO.  
1885 MASON AVE.  
ROCKFORD,  
ILLINOIS

For more data circle 291 on Reader Service Card

# Tips from Taft-Peirce on how to...



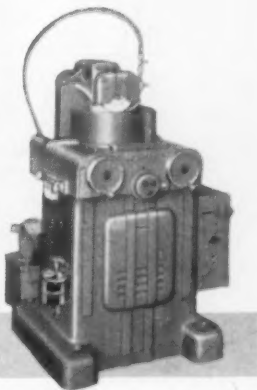
## Grind to .0001"

Hard to believe but true. This Taft-Peirce No. 1 Surface Grinder, with verniers, produces surfaces of an accuracy, flatness, and finish formerly considered difficult or impossible to achieve. Experienced operators frequently can grind to .00005", with surfaces so smooth, in many cases, they seal without lapping.



## Lower Lapping Costs

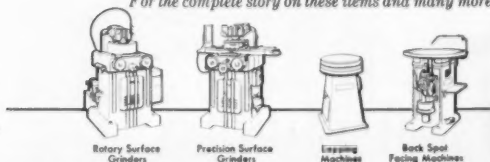
A T-P 24" Rotary Lapping Machine offers a fast, accurate way to obtain superfine finishes and true contact surfaces. Low in original cost, economical to operate, it has the speed and capacity for rapid processing in small lot manufacture or tool room work. Available with plain plate for cylindrical work, grooved plate for flat work.



## Reduce Grinding Time

Developed for our own shop, T-P 6" Rotary Grinders make fussy precision work easier and faster than ever before. Tilting Wheelhead tips 30 degrees below center... locks accurately in any position. Superpower magnetic chuck turns through 15 degree angle. Vernier feed permits .0001" vertical settings.

*For the complete story on these items and many more, send for your copy of the Taft-Peirce Handbook.*



Rotary Surface Grinders

Precision Surface Grinders

Lapping Machines

Back Spot Facing Machines



**THE TAFT-PEIRCE MANUFACTURING COMPANY • WOONSOCKET, RHODE ISLAND**

For more data circle 292 on Reader Service Card

May, 1955

modern machine shop 89

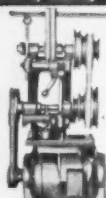
# SHELDON

CHICAGO U. S. A.

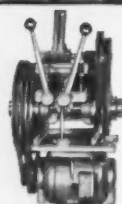
## MORE POWER at the Spindle Nose

The greater work capacity of 10", 11" and 13" Sheldon Precision Lathes comes in part from their extra power. Compared to other lathes of similar swing and price, Sheldon Lathes are built to take larger motors. Sheldon Motor drives are better engineered and better built. In place of a single ordinary V-belt to drive the lathe spindle, these Lathes have twin, Neoprene, cog V-belts (each capable of delivering 40% more power than an ordinary V-belt).

The greater wrap-around of Sheldon's twin cog V-belts not only delivers more power at the spindle nose—permitting heavier cuts, they also eliminate slippage at the spindle—increase accuracy of work. Made of oil, heat and static resistant Neoprene, Sheldon's Spindle belts have a longer life expectancy than other belts of similar type.

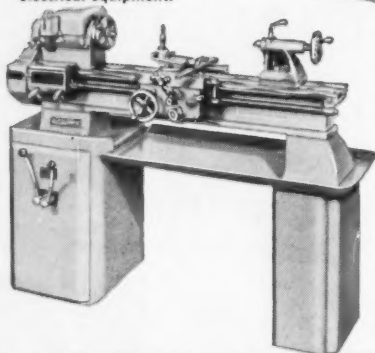


Type E



Type U

**UM56P**—with 4-speed external lever shift type U, underneath Motor Drive in heavy cast iron Pedestal base with storage space in tailstock leg. \$1434.00 F. O. B. Chicago, less electrical equipment.



**EM56B**—with 4-speed Type E, Underneath Motor Drive in Cabinet base. \$1467.00 F. O. B. Chicago, less electrical equipment.



Write for New G-55 Catalog

### SHELDON MACHINE CO., INC.

4250 N. KNOX AVE.

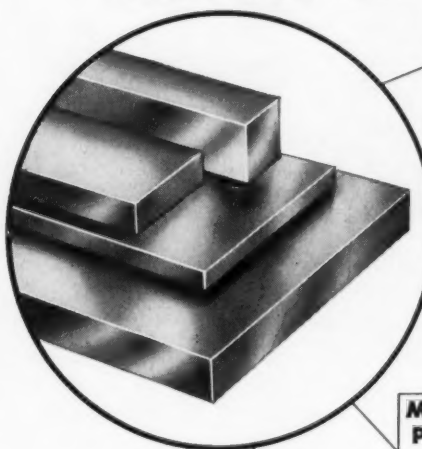
CHICAGO 41, ILLINOIS

For more data circle 293 on Reader Service Card

# LENOX

*Precision-Master*

## GROUND FLAT STOCK



### TEMPLATES



### GAUGES



### CAMS



### MACHINE PARTS



### PUNCHES



### DIES



ELIMINATES EXPENSIVE MACHINING OPERATIONS—  
PRECISION GROUND, THICKNESS WITHIN .001—  
NO DECARB IMMEDIATE DELIVERY

AMERICAN SAW & MFG. COMPANY · SPRINGFIELD, MASS.

Hack Saws

Band Saws

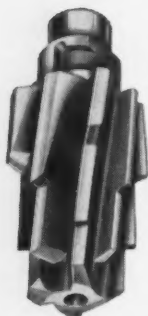
Ground Flat Stock

"THE TOOLS IN THE PLAID BOX"

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# **In Defense or Peace**

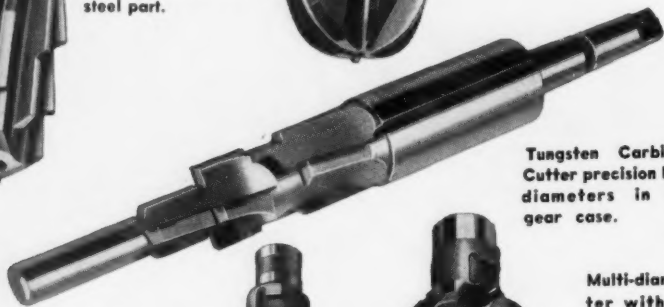
## **ECLIPSE** *Specials* ... ARE THE BEST BUY!



Eclipse Radial Drive High Speed Steel Cutter bores 5 diameters in steel part.



Special Cutter forms ball seat in road building machinery unit.



Tungsten Carbide Tipped Cutter precision bores three diameters in aluminum gear case.

Radial Drive Tungsten Carbide Tipped Cutter bores gear pocket in oil pump.



Multi-diameter cutter with Tungsten Carbide Tipped inserted blades for boring, counterboring and chamfering.

Since 1913—through two wars and during the peace years—Eclipse has met the exacting and changing demands of industry for special purpose end cutting tools. What better test? What better recommendation? Our large modern plant can serve you, too. Send your problem to us, today!

## **ECLIPSE COUNTERBORE CO.**

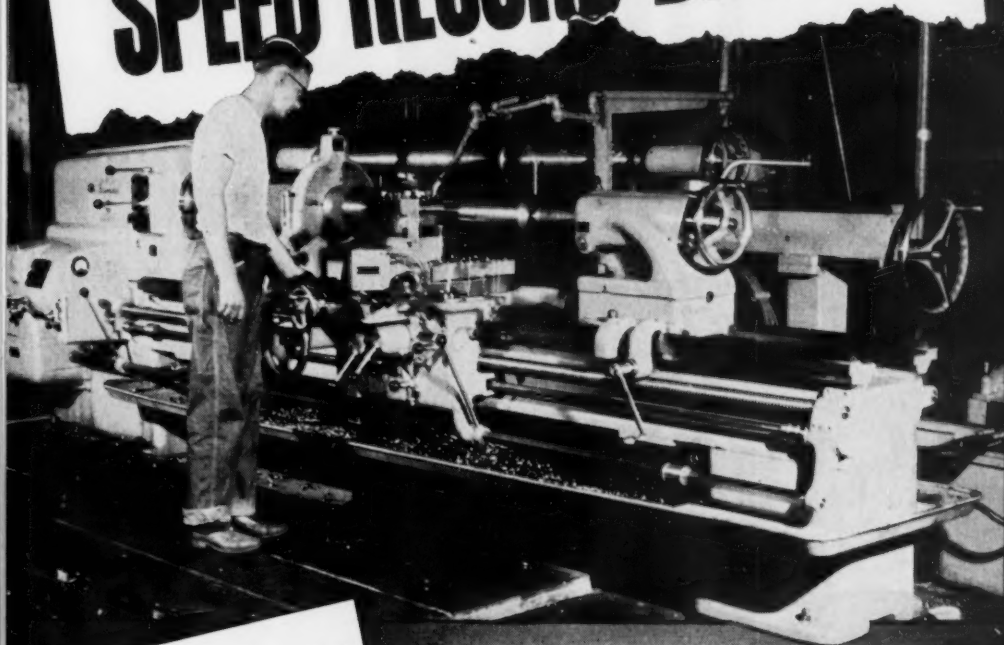
*Founded in 1913*

**DETROIT 20, MICHIGAN**

For more data circle 295 on Reader Service Card



# SPEED RECORD BROKEN



**2,000 Horse Power  
Motor Shafts  
ROUGH and  
FINISHED in  
2¼ hrs.**

**Former Time  
9 hours**

Fairbanks, Morse & Co., Beloit, Wisconsin, is getting this amazing production day after day on its 20 inch "AMERICAN" All-hydraulic Duplicating Lathe.

These shafts are made from 7½" diameter by 84" long hot rolled stock weighing 1059 pounds. A 30 horse power roughing cut and 15 to 20 horse power finishing cut completes the operation.

Note particularly that a finish turned motor shaft is used for a template, showing the rugged stability of "AMERICAN" Template Supports.

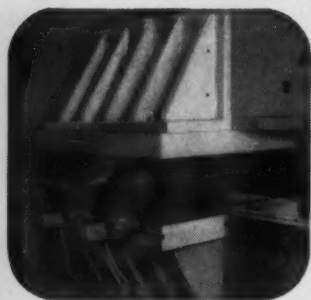
The quality of Fairbanks-Morse's products are universally recognized. We are proud indeed that so many "AMERICAN" Lathes and Radial Drills contribute to them. "AMERICAN" Hydraulic Duplicating Lathes hold many production records for work of this nature. Let us show you what they will do on your work.

*Send for Bulletin No. 35.*

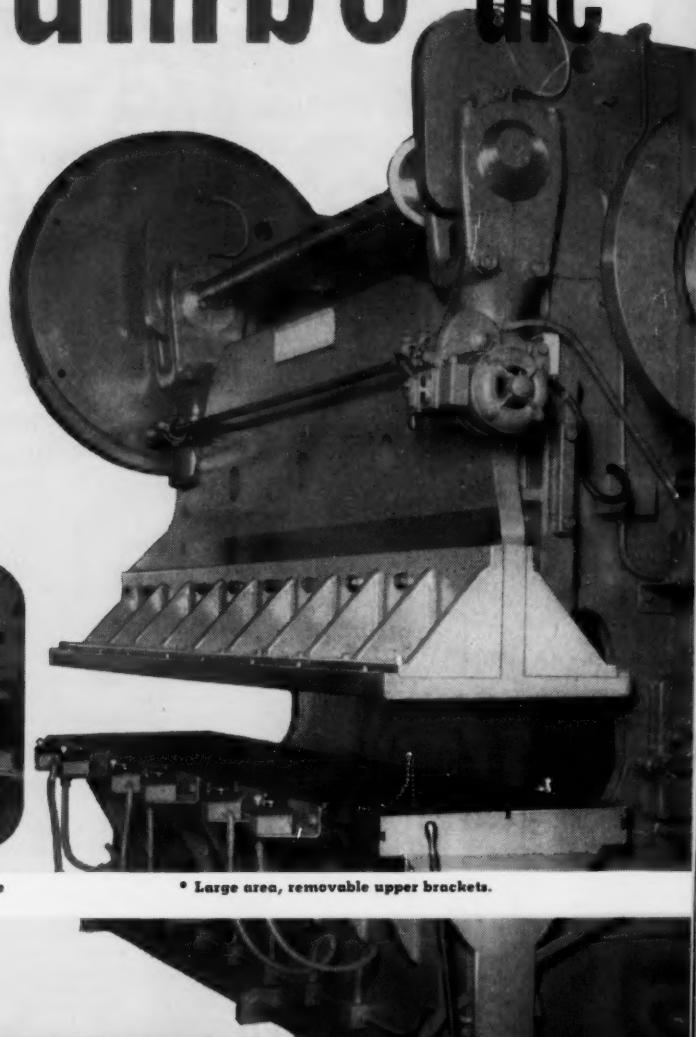
**THE AMERICAN TOOL WORKS CO.**

**Cincinnati 2, Ohio, U. S. A.**

# Jumbo die



• Short, special purpose, removable upper brackets.



• Large area, removable upper brackets.



**THE CINCINNATI SHAPER CO.**

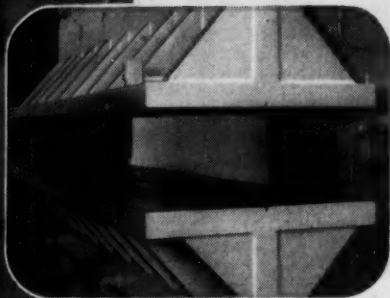
CINCINNATI 25, OHIO, U.S.A.

SHAPERS • SHEARS • BRAKES

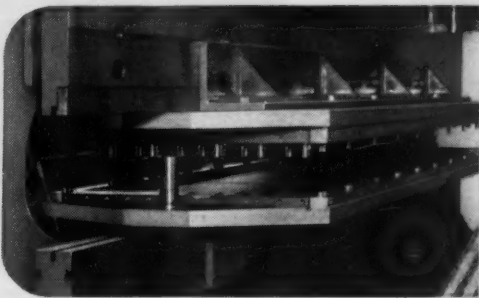
# areas . . .

## on Cincinnati Press Brakes

More and more jobs are being done on versatile Cincinnati Press Brakes. Removable or fixed brackets with large die areas permit many jobs to be done both in the Press Brake and Press fields. When dual purpose performance is required removable brackets are used—for Press work only, fixed brackets are furnished. Brackets are designed to sizes desired.



• Large area, permanent wide bed and ram for press work.



• Large area, removable upper and lower brackets.

**Investigate!** Our Engineering Department will be glad to advise you on the profit and production possibilities in your shop. Write for Catalog B-4.

*Cut die wear up to one half!*

with the new PRESS-RITE

# 45 TON

OPEN BACK • INCLINABLE  
**POWER PRESS**

TWO BUILT-IN  
STEEL TIE RODS run  
through the heart of  
the PRESS-RITE

Expensive  
dies last  
2 to 3  
times  
longer

Extra heavy  
4" CRANKSHAFT  
at main bearings

Rigid PRESS-RITE Construction . . . eliminates the constant flexing, shifting and binding caused by deflection that so quickly wears out dies and makes close tolerance work difficult.

Built for the job . . . Thousands of Press-Rite Presses are proving their ability to take hard, grueling work 24-hours a day. They'll do the same profit building job for you.

*Write today*  
for full details on this  
popular new 45 ton  
Press-Rite Press.

**SALES SERVICE MACHINE TOOL CO.**

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# PRESS-RITE

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CASE HISTORY NO. 2—TORQUE CONVERTER HOUSINGS



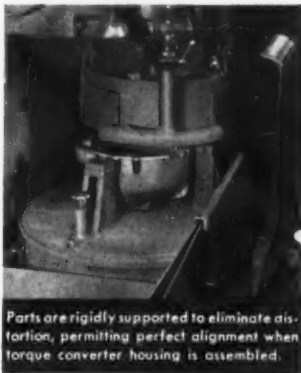
Open section made castings difficult to mill without springing ends. Two surfaces are now ground from the rough, holding flatness and parallelism within .0015"

Courtesy—Studebaker-Packard Corporation

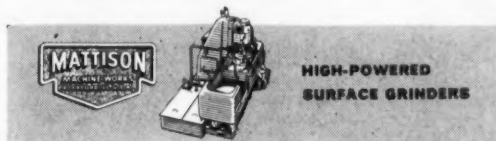
**Saves two milling operations... finish grinding difficult-to-machine casting to close tolerance**

These grey iron castings formerly were milled (two cuts per surface) and then finish ground to required tolerance. Today, top and bottom surfaces are ground in one operation on a "Duplex Rotary" at the rate of 17.4 pieces per hour... removing .060" to .070" stock from each side... holding all surfaces flat and parallel within .0015"... one operator and one machine easily doing the work of two!

With two rotary tables, the "Duplex" eliminates downtime ordinarily required for cleaning and loading the table. It's powered and rigidly built for heavy, multiple-pass grinding of small- or medium-size parts. So why pay more for facing operations, or for grinding on a single-table machine, when the Mattison "Duplex" can give you increased production, greater accuracy, and lower cost!



Parts are rigidly supported to eliminate distortion, permitting perfect alignment when torque converter housing is assembled.



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## No Need to Move This 13-Ton Work Piece!

Work stays put, throughout entire drilling operation. The Fosdick Traveling Base Radial does all the moving. With its 8' arm and 35' track, it easily reaches every part of the heavy work piece—a 72" x 16' table for a Rockford Hy-draulic Planer.

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If your drilling work includes heavy pieces like the planer table shown, you can cut excessive handling time to a bare minimum with a Fosdick Traveling Base Radial. When you need drilling equipment, always be sure to get a proposal from Fosdick.



**Traveling Base Radial features**

*Write for Traveling Base  
Bulletin No. TB-S,  
Radial Bulletin No. 37-S.*

## Long Reach of Fosdick

Traveling base traverses by push buttons conveniently located on head.

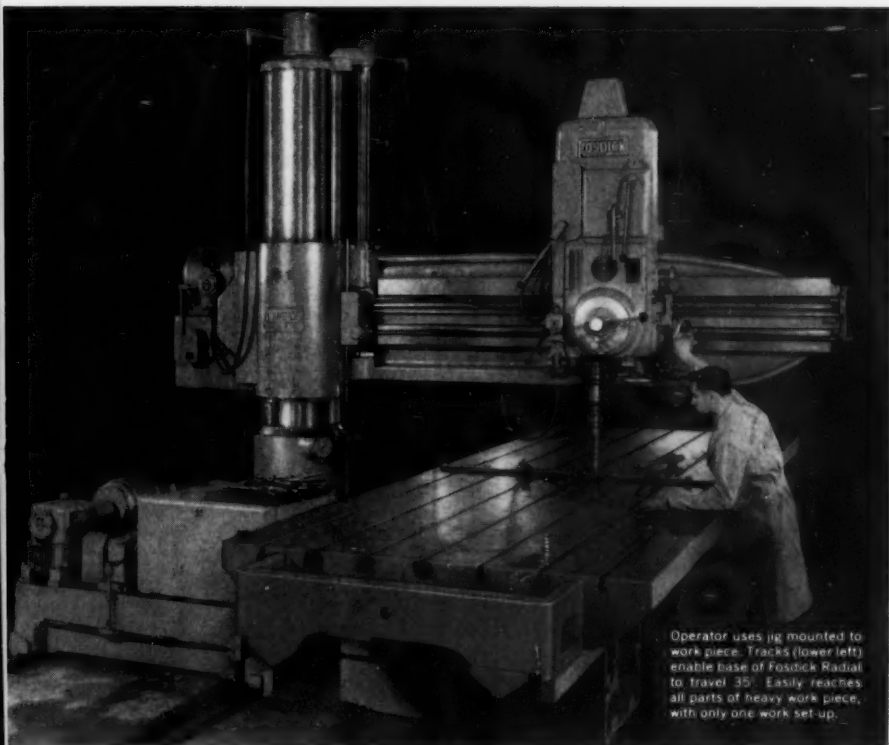
Traverse buttons also clamp and un-clamp base to rails, automatically.

Hydraulic rail clamps compensate for rail irregularities.

Interlock prevents arm from swinging while base is traversing. Base is heavy cast iron, honeycombed for rigidity and stable operation.

- Patented hydraulic arm and column clamps.
- Hydraulic arm clamp interlocked with single-lever control for unclamping and raising and lowering arm.
- Hydraulic interlock clamps head and column when feed is engaged.
- Hydraulic variable rapid traverse to head.
- Hydraulic safety nut.
- Superfinished column.





Operator uses jig mounted to work piece. Tracks (lower left) enable base of Fosdick Radial to travel 35'. Easily reaches all parts of heavy work piece, with only one work set-up.

## Traveling Base Radial Cuts Handling Time

**"Savings run up to 50% on jobs where handling time is a large part of total time. Fosdick performance has been excellent!"**

says K. M. Allen, Executive Vice President  
Rockford Machine Tool Company, Rockford, Ill.

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Radial Drills



Jig Borers



Sensitive and Upright Drills



Sensitive Radial Drills



Automatic Positioning Machines

# FOSDICK

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May, 1955

modern machine shop 99

## OVER THE EDITOR'S DESK . . .



### AMTDA REPORT

Elsewhere in this issue (page 188) we give you a full report on the recent Spring Meeting of the American Machine Tool Distributors Association. We believe that all readers of this magazine will be more than just a little bit interested in the subject matter discussed at this meeting. It was an outstanding meeting because of the forthright approach taken not only by the officers and members of the association but also by the guest speakers toward the important problems facing the metalworking industry today. You'll benefit from reading the report — the sum and substance of the AMTDA meeting.

★ ★ ★

### ELECTRIFIED HOUSEHOLD

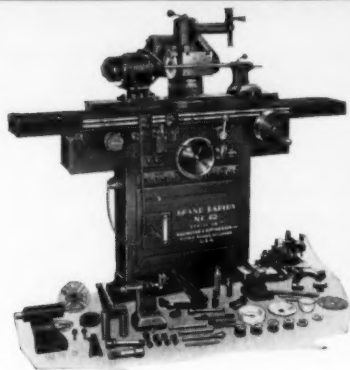
We thought that our household was fairly well electrified until we saw a list recently of what tomorrow's house will contain in the way of electrical gadgets, appliances, and equipment. If you, too, have thought yourself fully electrified, we invite your reading of the list. We'll wager

that your house is without at least two of the items. Here's the list: Heat pump, dehumidifier, electric dust precipitator, exhaust fan, glass panel and ceiling coil heater, separate surface cooking unit, oven, dish towel dryer, refrigerator, home freezer, dishwasher, food mixer, coffee maker, toaster, knife sharpener, waffle iron, sandwich grill, garbage disposer, dumb waiter, washer dryer, water heater, vacuum cleaner, floor polisher, electric typewriter, electric razor, electric fly killer, electric lantern for killing night insects, electric blankets, television set with motor-operated antennae, radios, clocks, hobby shop motors, high fidelity installation with speaker outlets in every room and an intercommunications system linking all rooms and front door, electrically operated interior doors, windows, vertical louvers, vertical venetian blinds, drapes, and jalousies which close automatically with the first drop of rain.

There is little doubt that the application of electric power to household uses will supply many jobs for many people for a long time to come.

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**AUTOMATION—ITS EFFECT ON ACCIDENT PREVENTION • By John B. Sterling**

Startling results—safetywise—can be expected from the use of automated equipment, according to the author of this article, who holds the position of supervisor of training at the Engine and Foundry Division of the Ford Motor Company in Berea, Ohio. In his discussion of automation as it is related to the safety engineer, the author defines, to some extent, two main subjects; namely, transfer type machinery built with automation in mind, and the coined word “automation,” meaning the automatic handling of parts between progressive production processes. Page 105.

**SHIFTING ELEMENTS FOR MACHINERY, PART II • By Fred Rogers**

In this concluding article, the author discusses shifting elements of the fork type, straddle shoes, slide shoes, and shifting rings and yokes. The text is illustrated throughout with sketches showing the design and operation of the different type shifting elements. Page 110.

**HYDROSPINNING AIRCRAFT COMPONENTS By J. A. Logan**

A giant new machine tool that squeezes cold alloy steels into desired shapes and that is capable of reducing production costs on many difficult-to-form aircraft components has been installed in Solar Aircraft Company's San Diego plant. The unit, known as a Hydrospin machine, is valued at about \$100,000, weighs 32 tons and was built by The Cincinnati Milling Machine Company. Page 122.



**FEATURES  
IN THIS  
ISSUE**

## **HIDDEN-ARC WELDING IMPROVES REEL DESIGN**

This report, based on a prize-winning effort in the Mechanical Design Competition of The James F. Lincoln Arc Welding Foundation, Cleveland, Ohio, covers both an interesting design and clever fabricating angle employed in producing large dresser reels for the textile industry. Page 124.

## **TAPE-CONTROLLED BORING • By John Rudolph**

Application of the punched-type principle of automatic operation to a boring machine producing instrument gear trains is outlined in this picture story on a system worked out by the Minneapolis-Honeywell Regulator Company. Page 128.

## **TAX TIPS FOR YOUR MACHINE SHOP**

**By H. E. Carroll**

As anticipated when the new Income Tax Code was passed last year, there have been revisions and rulings that have a bearing on the operation of your machine shop. This article outlines some of the more important rulings, recently passed, that affect your machine shop's tax planning. Page 130.

## **PRACTICAL METHODS OF STEEL IDENTIFICATION • By Howard E. Boyer**

The information presented in this two-part article is particularly applicable to those shops where highly diversified manufacturing operations are performed and where problems revolving around mixed steels tend to become sizable. We suggest that you try the helpful ways outlined in this article to determine the characteristics of mixed-up steels in your shop. The second part of this discussion will be published in the next month's issue of this magazine. Page 140.

**FEATURES  
IN THIS  
ISSUE**



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104 modern machine shop

May, 1955





# AUTOMATION

## Its Effect on Accident Prevention

**Startling results—safety wise—can be expected from use of automated equipment.**

By JOHN B. STERLING

Supvr. of Training, Engine and Foundry Division,  
Ford Motor Co., Berea, Ohio.

**At Ford Motor Company**, as it probably would be in other companies, the extent of automatic handling (or automation as we prefer to call it) is largely determined on the basis of engineering studies based upon our experience and the experience of the machinery industry in general. These, coupled with an economic analysis, determine how far it is practical to extend automatic handling operations.

In our discussion of automation as it is related to the safety engineer, there are two main subjects which we feel should be defined to some extent in order that a clear understanding of the problems involved may be obtained.

First: Transfer type machinery built with automation in mind. The transfer type machine combines similar operations to be performed on a part into one continuous machine with automatic indexing between work stations.

Second: "Automation," which is a coined word, meaning the automatic handling of parts between progressive production processes. It is a separate and distinct phase of manufacturing engineering which coordinates the efforts of various departments in our plants, and the machinery can become, in effect, one large transfer type machine with facilities to handle the parts as well as the scrap generated.

*To illustrate the techniques employed in the use of the transfer type machinery, we can consider the production of automotive crankshafts. One portion of our machining process involved the drilling of six oil holes, six metering holes, six lightening holes, and inspection of the operation.*

Ten or twelve years ago, twenty-nine separate machines would have been required, while today the same department would require only three transfer type machines of eight sta-

## Essential facts from a paper delivered before the 42nd National Safety Congress

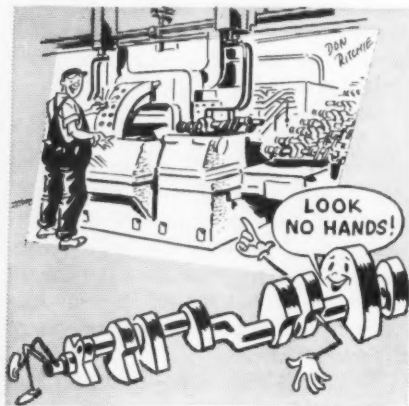
tions each. The part would be loaded at one end and unloaded at the other end with all operations in between being completely automatic.

In order to fairly evaluate the effect that automation is having on the safety of our employees, I believe it is important that we consider what it accomplishes in the elimination of the well-known accident causes which are found in the non-automated type of operation. With regard to the latter, particular reference is made to single operation machines where there is a need for manual handling of heavy stock in the loading, positioning and unloading of the machine and the transfer of stock from one operation to another.

As safety men, we are all quite aware of the fact that stock handling,

especially that which is heavy by nature, is an important contributor to industrial injuries. It is well-known that a very high percentage of serious foot injuries are the result of heavy stock falling from a transfer truck. It is further a fact that the handling of stock is almost the exclusive cause of industrial hernias and injuries to the back.

Now, let us see what automation has done to eliminate or minimize these accident causes. In many instances, after the initial loading of the stock into a series of in-line machines, a multiplicity of operations are performed without the need for any manual stock handling whatsoever. By comparison with former methods of single operation machines, it is obvious that the hazards associated with manual handling of



"To illustrate the techniques employed in the use of the transfer type machinery, we can consider the production of auto crankshafts."



"We truly believe that automation has taken the back break, and the 'foot-break' for that matter, out of engine manufacturing."

stock into and out of a machine and transferring it to the next operation is almost entirely eliminated. By the same reasoning the hernias and back injuries directly related to heavy lifting are greatly minimized, if not entirely eliminated.

**Our experience indicates** an 85.5 per cent reduction in the number of hernias in similar operations with the advent of automation. *We truly believe that automation has taken the back break, and the "foot break" for that matter, out of engine manufacturing.* We are most thankful for this, for not only have we been able to reduce our accident rate and the related costs, but far more importantly every day we are sending our employees, safe and sound, home to their families.

Although I am not a safety engineer, I am quite aware of the fact that every safety man dreams of the perfect mechanical operation where, in the performance of his job, the employee need not, at any time, expose himself to the working parts of a machine. It is a well-known fact that most of the serious injuries to hands and fingers are the result of the operator exposing himself to the closing or working parts of a machine in the process of loading or unloading it. It is recognized that this problem has been solved to a degree in the single operation method by the application of indexing fixtures, sliding dies and the use of tongs. However, at its best, you are faced with the problem of enforcing the use of these provided devices. While automation has not completely solved this important problem, it is a real step in the right direction since it completely eliminates the need for

repetitive exposure to the point of operation.

We recognize, however, that because of the relationship of one automated operation to another, it is highly important that a breakdown or machine failure be quickly corrected. This condition could result in the repairman inadvertently exposing himself to working parts of the equipment. However, we have been able to solve this problem with a high degree of success by invoking our safety policy of long standing which provides that before working on a piece of moving machinery the repairman must completely de-energize the equipment by placing his personally issued padlock on the power source. So, with regard to hand and finger injuries, we see in automation the possibility of almost complete elimination of this problem.

*I am sure you are wondering what happens when a piece of stock gets out of position in its travel*



*"... when a piece of stock gets out of position in its travel... 'push' or positioning sticks are provided at convenient locations."*

*"... from a safety standpoint, a machine will be ready to run the moment it is set on the floor."*

*through a given sequence of operations. To avoid the need for the operator reaching into the equipment to reposition the stock, "push" or positioning sticks are provided at convenient locations for this purpose.*

**The very nature of automation** dictates the generous use of stiles or cross-overs for the convenience and safety of employees in traveling from one location to another. These stiles are strategically located throughout the plant. They are not only important in terms of normal travel but serve an important purpose in the emergency evacuation of the plant.

Our engineers and safety personnel are constantly alert to the improvement of the design of our machines as it relates to the safety of employees. Their thinking has been passed along to our machine tool builders who have incorporated it into the design and construction of machines being built for our plants.

In many instances, the representatives of these companies came to our plants and consulted with our engineers and safety personnel and, in other instances, our representatives visited the machine tool builder's plant and advised him of our needs and requirements with regard to mechanical safety.

*The net result of this relationship has been a thorough understanding on the part of our machine tool builders of our program to engineer the mechanical hazards out of the job. While we recognize that there*

will, undoubtedly, be a continuing need for the guarding of mechanical hazards, we firmly believe that great progress is being made in simplifying the problem by reason of our close relationship with the people who build our machines. It is a fact that our experience with the complexity of automation has contributed greatly to the decreasing need to add guarding to machines after they are delivered to us. We are rapidly approaching the time when, from a safety standpoint, a machine will be ready to run the moment it is set on the floor. As evidence of this fact, I am advised by our safety personnel that the machines we are receiving for a new plant in Cleveland are coming in almost completely guarded. It is important to note that a very minimum amount of



*"The net result . . . has been a thorough understanding . . . of our program to engineer the mechanical hazards out of the job."*

additional guarding will have to be applied to them. We believe this is significant since our standard in this regard is very high.

You may gather that the automation of industrial processes represents a completely new approach to the subject of employee safety. I assure you that this is not the case. It is a fact that the same old principles, so well-known, still apply as they did in the single operation process. Our best friends in this regard still are:

1. Engineer the hazard out of the job.

2. Guard the hazard.

3. Educate the personnel.

We have dwelled pretty much on the first two principles so I would like to explore our approach to principle number three — educate the personnel.

*We recognize that in safety, as in all other aspects of our job, there is no substitute for a well trained and*

(BOYS - MAKE SAFETY  
RULES A PART OF YOU!)



*"We recognize that in safety, as in all other aspects of our job, there is no substitute for a well trained and informed employee."*

*informed employee.* A typical approach to this principle is exemplified in our Cleveland plants by the following program for employees:

1. Safety is included in the induction of newly hired hourly workers by the hourly personnel section.

2. A personal indoctrination is given employees by safety unit representatives.

3. They are routed through our safety shoe store where safety shoes and spectacles are emphasized.

4. General safety rules are issued in a package.

5. Foreman's induction check-off list requires coverage of safety as one item.

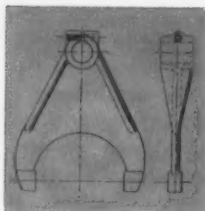
6. A check-off list issued by safety itemizes the coverage by the foreman and, when complete, the form is submitted to safety for filing.

7. On the job a follow-up by the foreman and the safety engineer is initiated.

8. Bulletins of unusual or new accident causes are distributed to all employees in some cases; to supervisors only in others.

9. A series of five-minute safety talks are given by supervision periodically to their hourly-rated personnel.

While the representatives of safety have an important part in the training of our employees, the basic responsibility in this regard rests completely and entirely with our foremen. In order to better equip these members of management to meet this important responsibility, we conduct regular safety training conferences with them. This is an organized program designed to make every foreman the safety director of his department.



# Shifting Elements For Machinery

## Part II

*In this concluding article, the author discusses and illustrates shifters of the fork type, straddle shoes, slide shoes, and shifting rings and yokes.*

By FRED ROGERS

**Part I of this article** dealt with shifting devices consisting of levers that were rounded where they contacted the shifting media; plain pins and screw pins engaging forks; round surfaced and tapered rollers; square and rectangular shoe blocks; and various shapes of integral and shank type shoes. This concluding article will discuss shifters of the fork type, straddle shoes, slide shoes, and ring and yoke shifting elements.

In the examples illustrated in

Part I, the shoes were mounted at the ends or ears of the shifting fork. The fork was pivoted above, below, or beside the shifting element so that an oscillating movement of the fork caused lateral movement of the part to be shifted. It was necessary for the shoe, in turn, to be capable of a compensating oscillating movement upon its centering pin. In the several following designs the yoke and shoe are made in one piece. Instead of being pivoted, the combination yoke and shoe is moved parallel to the shifted member.

In the first example, Fig. 24, the fork is cast of bronze. The shoe portion is milled to the proper width, forming a T-shape shifting element which encircles the spool 90 degrees. The shank between the shoe and hub is approximately square in cross section for strength. The hub is split and fastened to the shaft by a cap screw placed tangentially. Some designers prefer to key the fork to the shaft. The key would be on the lower side, opposite the screw.

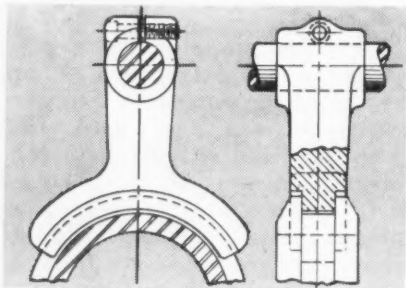


Fig. 24—The yoke and shoe in this design are made in one piece which is moved parallel to the shifted member; the fork is cast of bronze.



Some claim that the split should follow down the shank a half inch or so below the shaft and that this split should be used as a keyway. One of the features of this type of shifter is that it can be slid along its shaft and positioned to the spool, whereas the pivoted oscillating yoke requires the spool to be located to it. It is stated that prior to World War II, German designers had to find a substitute for this type of shifter made of solid bronze. It was made of malleable iron with shoe faces of molded plastic that were held on the fork with copper rivets.

**According to tests** conducted over a period of time, this design proved to be a very satisfactory substitution. In addition, shoe blocks were also made of the same type of synthetic material. So long as an oil-proof plastic was used, swelling did not take place. In the particular design mentioned, the shoe portion extended 180 degrees around the spool with four plastic pieces placed diametrically opposite each other, two per side.

To shift a cluster gear, composed

of two gears with inside faces  $5/16$  inch apart as shown in Fig. 25, the designer decided to fabricate the shifting fork from three pieces. A 90-degree shoe is welded to a piece of  $1/4$  by  $1\frac{1}{4}$ -inch bar stock which in turn is welded to a hub. The shank is band sawed out semi-circular at the upper end to fit the hub, and the assembly thereafter welded together. As can be seen, there is a  $1/32$ -inch clearance between the gear faces and the shifting shank.

**In Fig. 26** the shank actually becomes the shoe to engage the spool cut in the hub of the gear to be shifted. This shoe end also has a 90-degree contact with the spool area. The upper end is rounded to conform to the size of the hub. Both hub and shank are chamfered at one end and the 90-degree void filled with welding material as shown. Although not shown in Figs. 25 and 26, the forks were fastened to the shafts by taper pinning after the correct position was found during the assembling operation. In both instances, the material was left soft. Operating in an oil bath, they gave

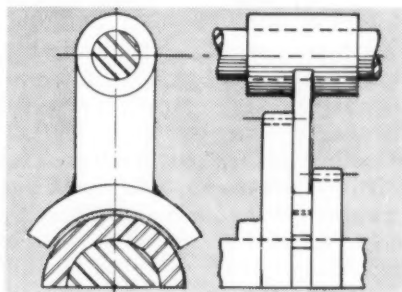


Fig. 25—The shifting fork in this sketch is made from three pieces and designed to shift a cluster gear with inside faces  $5/16$  inch apart.

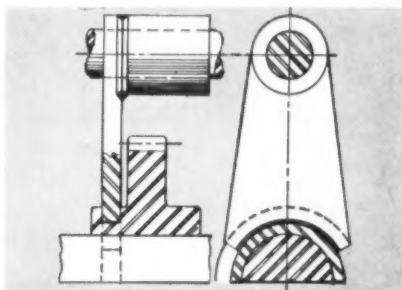


Fig. 26—In this design, the shifting shank actually becomes the shoe to engage the spool cut in the hub of gear to be shifted.

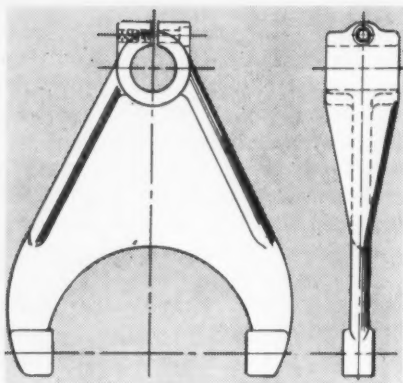


Fig. 27—The desire for a lightweight, yet strong, shifting fork prompted the design shown in this particular sketch to be made.

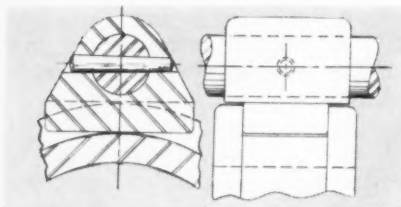


Fig. 28—In many designs of shifting arrangements, it is not possible to first reach the center line with shoes or secondly have two shoes.

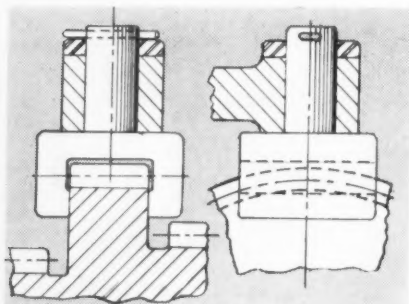


Fig. 29—This sketch shows a design of straddle type shifting shoe which is particularly designed for moving a cluster of three gears.

**"... shifter operates smoothest if shoes are 180 degrees apart."**

satisfactory service for the light work they were required to perform.

The desire for a lightweight yet strong shifting fork prompted the design shown in Fig. 27 to be made. It is a steel casting made with low carbon content. The section is comparatively thin but four ribs of the same thickness as the body follow the angular sides from the hub downward. The hub is split for a tangential screw. The shoes are somewhat wider than the body and are faced off centrally with a common center line. The shoes are thereafter case carburized and hardened to a depth of about 0.050 inch. They are then ground on the faces.

**The most successful shifter**, regardless of its type or design, is claimed to operate the smoothest if shoes are placed diametrically opposite each other; that is, 180 degrees apart so that they exert pressure on a common center line. However, in many designs of shifting arrangements it is not possible first to reach the center line or secondly to have two shoes. Figure 28 illustrates the point in mind. A spool of comparatively large diameter with flanges far apart had to be shifted smoothly and without binding. The shifting shaft was placed close to the periphery of the spool and a shoe, as shown pinned to it. While just a rectangular block of steel would have done the work, it was shaped angularly and rounded to conform to the shaft, mostly for appearance. Also, it was desired to have the hub

somewhat longer than was afforded by the width between flanges. All the contacting surfaces were heat treated. The clearance between the bore of the spool and the shaft was kept at a bore minimum for proper sliding without binding.

**Figures 29 through 33** illustrate various designs of straddle type shifting shoes and provide further proof that shifting need not always take place with two diametrically-placed shoes. In Fig. 29 a cluster of three gears is to be moved. The central gear having straight unflanged sides is forked by a straddle shoe. The inside surfaces are relieved so that as little of the bearing faces touch the teeth, which can be seen in the end view on the right. The shank of this shoe is integral and is free to turn in the boss of a pivoted and oscillating shifting lever. Because the forked shoe hangs downward, it must be retained with a washer and cotter pin. As the surface speed of the gear at the contact-

ing point is high, the shoe is hardened and ground.

In Fig. 30 a similar shoe is shown spanning two gears. This is necessary because the difference in gear outside diameters does not warrant a narrower type, as in the previous example. The outside surfaces of the teeth are relieved slightly so that they do not touch the shoe surfaces. One or the other should be relieved to prevent a shaving action of the square edges on the contours of the teeth. In this type of shoe, the center of the lever pivot should be in the center of movement, so that cross movement on the gear sides is as slight as possible.

In Fig. 31 a small and narrow straddle shoe engages a ground flange at the side of the gear. In this case, the shifting is done closer to the center of the shaft. The shoe shank is grooved above the lever boss and a round wire snap ring is used as a retainer. This is merely a single coil of a music wire spring

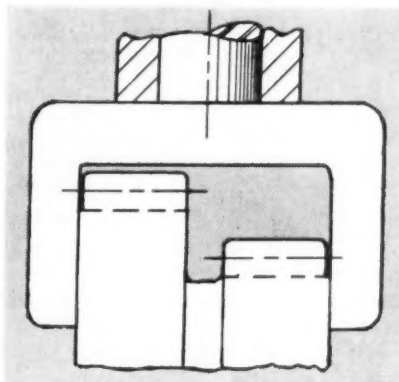


Fig. 30—A shifting shoe which is similar in design to the shoe shown in Fig. 29 is illustrated in this sketch, spanning two gears.

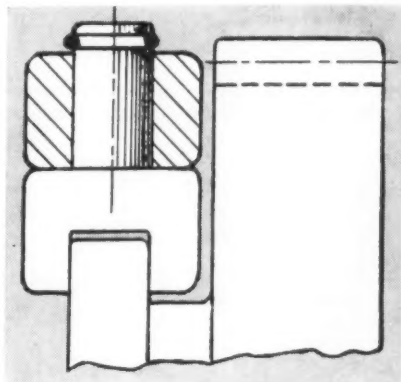


Fig. 31—In this sketch, a small and narrow straddle shifting shoe engages a ground flange which is located at the side of the gear.

*"All of the shoes . . . have had a relatively small area of contact with the shifting spool."*

snipped off a length of coil and bent to lie flat before snapping onto the shank.

The shifting shoe in Fig. 32 is unusually compact. The movement is parallel to the axis of the gear to be moved. The shifting shaft is located eccentrically in a cylindrical shoe and taper pinned. Although not absolutely necessary, the shoe is milled out circularly to conform to the outside radius of the gear. A straight cut would suffice. In fact, a shoe of this design has been used where the circular or straight cut have just cleared the taper pin, cutting nearly halfway through the shaft. In the

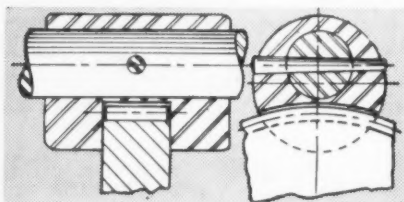


Fig. 32—The particular shifting shoe shown in this sketch is of unusually compact design.

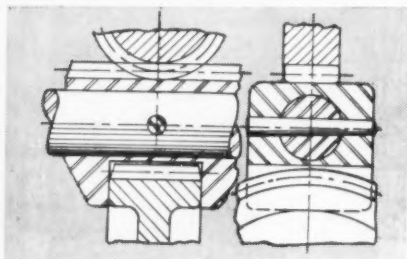


Fig. 33—This sketch shows a type of shifting shoe which is approximately square in design.

design shown in Fig. 32, the gear teeth are relieved. The end view shows an elliptically shaped contact between shoe and gear.

Figure 33 shows a similar shifting shoe which is approximately square. It has rack teeth cut integrally, meshing with a pinion. This pinion is connected by a shaft to the outside of the machine where it is shifted by a lever riding a quadrant with positioning stop pins. The gear to be shifted is flanged and has angularly relieved teeth. The area of contact can be observed in the end view.

**All of the shoes illustrated** and discussed up to this point have had a relatively small area of contact with the shifting spool. In a few examples, single yoke type shoes had a total span of 90 degrees, while several double-shoe constructions had a 90-degree contact each, for a total of 180-degree contact. In Figs. 34 through 40, a 360-degree bearing is used. These thrust or shifting collars are much in evidence in the manipulation of single plate and multiple disc friction clutches. These clutches are variously used with flat and V-belt pulley drives and gear and chain sprocket drives. Positive toothed clutches, both as cast and those having machined teeth, utilize these teeth for a shifting medium with the sliding sleeve, disc or spool.

In Fig. 34 a bronze casting is used which is split in half before it is machined. These halves are held together with two hexagon head bolts and nuts. The bore is finished to fit

the single flange of the shifting member as shown in the partial section view below the main view. Halfway around from the holding bolts are two machined trunnions which are engaged by the shifting lever (not shown). A hole is drilled and tapped longitudinally through one of the trunnions into which a grease fitting is screwed. In one manufacturer's design in which the trunnions are assembled in a vertical position, an oil cup is utilized instead of a grease fitting. In another design, the fitting is screwed into the ring portion midway between the trunnion and the hex head bolt. During the war when bronze had to be conserved, such a thrust collar was made of a steel stamping and a thin lining of bronze was brazed in. The trunnions were turned separately and were anchored and brazed into the collar. A saving of nearly 85 per cent was effected in the amount of bronze used.

**Another design of shifting collar** is illustrated in Fig. 35. Instead of a single flange being used as in Fig. 34, a double flange spool-like shifting is used. The shifting collar, made of bronze, rides between these two flanges. The upper part of the sketch shows the outer view, while the lower part is in cross section. The assembly is clamped together and is lubricated in a manner similar to that in Fig. 34. The trunnions are turned to a shoulder against which the shifter rides.

The shifting collar in Fig. 36 is made of cast iron and is solid instead of being split. The hub of the element being shifted is grooved to receive a bronze ring. This ring is split after it is machined, and the two

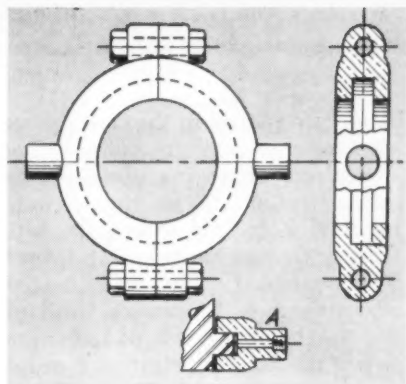


Fig. 34—In this shifting collar, a bronze casting is used which is split in half before machining. The halves are held together with the aid of two hexagon head bolts and nuts. The bore is finished to fit the single flange of the shifting member shown in the partial section view located below the main view.

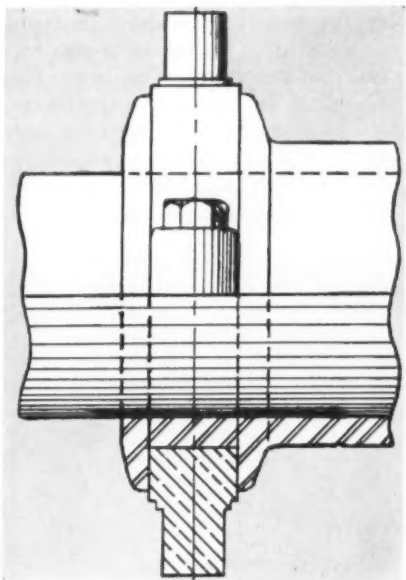


Fig. 35—This design of shifting collar utilizes double-flange spool-like shifting arrangement.

**"To overcome friction . . . a ball bearing is used in some designs of shifting collars."**

halves are placed in the hub groove after the steel retaining collar is first slipped on. Thereafter, the cast iron shifting collar with its double counterbored hole is fastened on with three or four socket head cap screws. The assembled collar, while centered on the hub, has ample freedom, the bore being about  $1/64$  inch over-size of the hub. Lubrication is as described for Fig. 34. The sectioned view at the right is taken down through the axis of the trunnion.

**To overcome friction** as much as possible, a ball bearing is used in some designs of shifting collars. The sketch in Fig. 37 is suggestive only in the application of this type of bearing but it does show that precautions must be taken to ensure a dirtproof assembly. The inner ring is held on the hub with a nut having face spanner holes to keep the periphery smooth. A piece of felt or other material seal bears against this periphery, the former being pressed

into the threaded flange which retains the outer race of the bearing. Suitable grooves are provided so that lubricant enters the bearing. A bearing of the deep groove or angular contact type is used which will absorb the thrust in one direction, usually when the clutch is being engaged.

**In another design** of ball bearing thrust collar (not shown), a double shielded bearing is used. These shields are built into the ball bearing; that is, the thin steel shields are swaged into a groove each side of the ball cage in the outer ring. Because the width of the bearing does not change over that of a standard bearing of the same size, the overall width of the collar can be reduced, resulting in a much narrower assembly than that shown in Fig. 37. In this design, the nut and threaded flange were replaced with purchasable snap-rings, one ring holding the inner ring on the hub and another

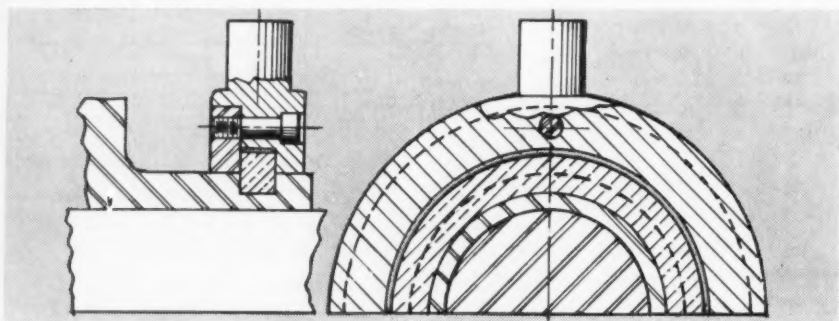


Fig. 36—The shifting collar in this assembly is made of cast iron and is solid instead of being split. The hub of the element being shifted is grooved so as to receive a bronze ring.



retaining the bearing in the shifting collar. Both in this example and in that of Fig. 37, the shifting collar is made of cast iron in solid form (not split). However, the lubrication of this particular design differs markedly. Double-shielded bearings are usually furnished packed with lubricant which, in many instances, lasts for the life of the bearing. Clearances between the shields and the shouldered inner ring of the bearing are so slight that all the lubrication is retained within the two shields.

**There are several ways** in which the shifting collar may be moved, three of which are illustrated in Figs. 38, 39, and 40. In Fig. 38, two pieces of steel are forged to the shape shown. They are made thicker at the point where they contact the trunnions of the collar. A machined slot on each side is centralized in this boss, the slot being long enough to accommodate cross movement as the collar is moved horizontally. The two pieces are connected at one end to the pivoting member and at the other end to the extension which acts as the handle. As in some of the other types of shifting collar, the pivot should be located centrally regarding the movement of the collar. Usually grease is applied to the trunnions to minimize wear. Although the assembly is shown to work horizontally, it can be placed vertically or at an angle, according to the convenience of the operator.

In Fig. 39, a cast iron shifter is used. It is of the fork design, the ends being milled out to suit the trunnions. The pivot shaft is placed below the shifting collar and the double solid fork is split and fasten-

ed thereon. The casting is faced on the inside of the forks to suit the trunnion span.

The design shown in Fig. 40 differs with that in Fig. 39 in that the shifting arms are two distinct castings instead of being joined. A forged rod end slips over the shifting trunnion and into the hole in the shifting arm. As the collar is moved back and forth, these rod ends slide up and down in the hole slightly.

**In the two previous designs,** the trunnions had but a tangential line bearing. In the present design, a 100 per cent bearing is available to each trunnion. Although not shown, this collar is solid. It fits on one end of the hub of the shifted member which is turned down and shouldered. An end flange is then screwed fast to the hub, making in reality a spool like the one shown in Fig. 35. The arms are taper pinned to the manipulating pivot shaft. The rod ends used in this design can be purchased in various diameters and lengths from manufacturers of drop forged open end wrenches and various other items of a similar nature.

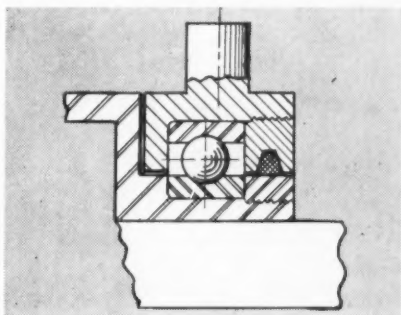


Fig. 37—To minimize friction, a ball bearing is employed in some designs of shifting collars.

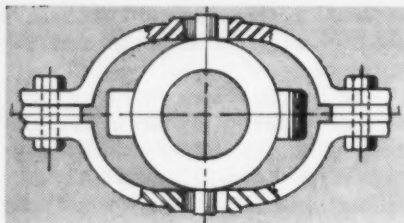


Fig. 38—This sketch shows an arrangement designed for moving the shifting collar, in which two pieces of forged steel are utilized.

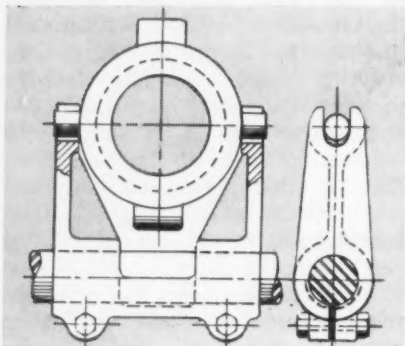


Fig. 39—The assembly shown in this sketch utilizes a cast iron type of shifter of fork design. The ends of this particular shifting element are milled out to suit trunnions.

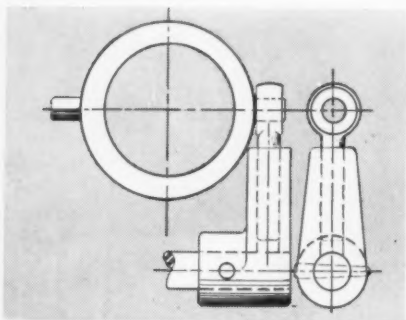


Fig. 40—In this design, the shifting arms are two distinct castings instead of being joined together as in the assembly shown in Fig. 39.

**"Some form of roller or shoe becomes necessary . . ."**

Square, slotted, and dovetail slides are sometimes moved by bell-crank levers, straight, pivoted levers, or by similar means. Some form of roller or shoe becomes necessary if loads exceed those requiring only the engagement of a plain pin with the shifting lever slot. Such shoes are illustrated in the assemblies in Figs. 41, 42, and 43. In Fig. 41, a T-shaped shoe appears in which the flanges at the top act as guides. The body of the shoe is rectangular, becoming approximately square in shape at the head. This shoe rides in the slot of a link, the ends of the slot being round. Piece A is a lever into which the shoe-holding stud is screwed. This lever when swung (pivot above) backward causes the shoe to come in contact with the adjusting screw at the right which, in turn, causes the link B to travel to the right until a latch is tripped.

**The shoe is free to oscillate** about the stud the slight amount necessary as there is clearance between the top of the shoe and the head of the stud. The link B is, in turn, retained against the lever A by the flanges on the shoe but with sufficient floating clearance. The rounded slot in the link is actually much longer than shown in the sketch so that a long adjusting screw makes possible any desired length of stroke necessary for the proper functioning of the mechanism. Because of the light duty imposed on the pieces, they are made of low carbon steel, unheat treated.

A dovetail slide is required to be moved to and fro by a bell crank, as shown in Fig. 42. This bell crank has one lever arm that is slotted to engage the shoe. Actually, the lever is cast solid and drilled out at the four corners of the slot. The rest is then shaped out to a close fit for the shoe. This shoe is made like a roller from round stock and is then flattened by grinding to fit the groove. The shoe is held on the dovetail slide with a headed stud which is countersunk into the slide for added strength. Whereas the stud in Fig. 41 is as strong under the thread shoulder as the root of the thread, this latter construction causes the strain to be absorbed by the body of the stud. This shoe is also free to oscillate slightly as the lever moves. The slotted arm of the bell crank rests on the top of the dovetail slide.

**The square slide** in Fig. 43 is operated by a lever arm with an inverted slot. The bottom of the slot rides on the top of a rectangularly shaped

shoe. The four corners of the shoe are rounded so as not to interfere with improperly squared corners in the lever slot. The shoe therefore can be assembled upside down or with the backside forward. The lever cannot rise; therefore, it retains the shoe which oscillates about a plain bodied pin.

**The 360-degree or ring shifting shoe**, shown in Fig. 44, can be applied to cluster gears, as well as clutch shifting mechanisms. The double gear cluster is keyed (not shown) to a pinion sleeve to form a three-gear cluster. Near the end of this pinion sleeve is placed a bronze shifting ring, the shape of which can be seen in the cross-sectioned view at the right. A nut is screwed on the end of the pinion sleeve against a shoulder. The various thicknesses are held to close tolerances so that their total length coincides with the body length of the pinion sleeve, allowing about 0.005 inch freedom. The ring rides in the spool formed

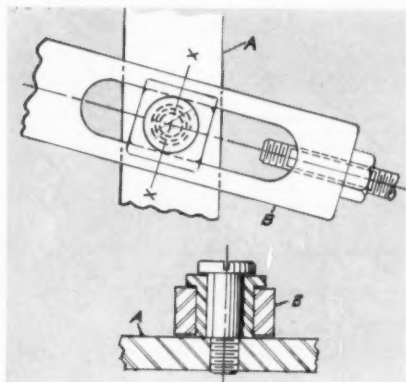


Fig. 41—This sketch shows a T-shaped shoe in which the flanges located at the top act as guides. The body of the shoe is rectangular.

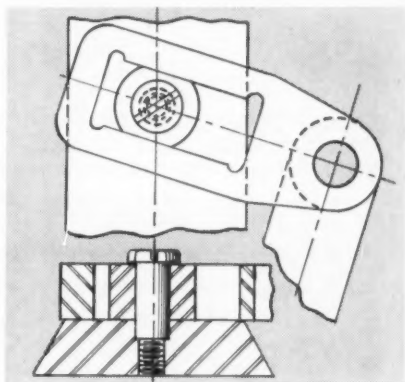


Fig. 42—This sketch shows an arrangement for moving dovetail slide to and fro with bell crank having arm slotted to engage shoe.

***"Because of severe spring load, a thrust bearing is interposed between the plate and shifting ring shoe."***

by the nut and one of the gear hubs. A rod is pinned into the hub of the shifter ring for moving the entire assembly along the shaft. The ring is ground on both sides, as is the face of the gear hub. The contacting face of the nut is also ground. The threads are a loose fit on the pinion

sleeve while the shoulder at the threaded end is finished off for a surface as perpendicular as possible to the pinion sleeve axis. The hand of the thread is such that screwing off of the nut is not possible when the gear cluster is in motion.

A similar arrangement to that shown in Fig. 44 is outlined in Fig. 45. The shifting shoe is in reality a lever, one end of which (not shown) is connected to a shaft which is parallel to the axis of the assembly illustrated. The ring end encircles the hub of a cast iron clutch plate, the latter sliding on a multiple-splined sleeve. Heavy spring pressure against the lever (not shown) causes the clutch plate to stay in engagement with its mating plate (not shown). Because of this severe spring load, a thrust bearing having

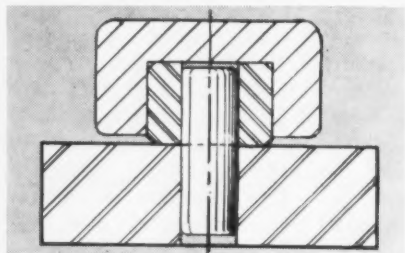


Fig. 43—The square slide in this sketch is operated by a lever arm with an inverted slot.

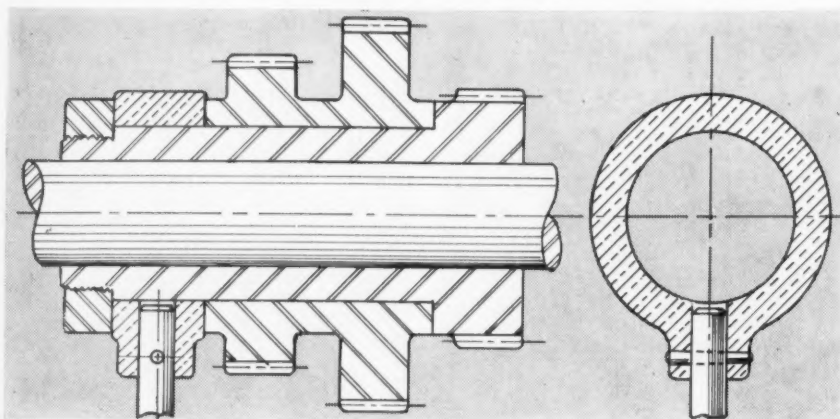


Fig. 44—The 360-degree shifting shoe, or ring shifting shoe, shown in this particular cross-sectional sketch can be applied to cluster gears as well as to clutch shifting mechanisms.

grooved ball races is interposed between the plate and the shifting ring shoe. Wear on the ring shoe is therefore kept at a minimum. The nut at the left acts as the other flange of the built-up spool and takes the thrust when the clutch is disengaged. The nut is adjusted to the desired clearance for the ring and is locked in that position with a hollow head set screw pressing against a brass shoe which is serrated to fit the threads of the clutch plate hub. The thrust bearing is obtainable commercially. The ring shoe lever is made of bronze and the nut is steel of low carbon, case carburized and hardened. The inside face which is next to the ring is surface ground. The bearing ring is, of course, hardened and ground.

**While the clearance** between the shoe and the flange of the shifting spool shown in Fig. 45 can be adjusted to compensate for wear, nothing has been said up to now about adjusting the clearance for square or

rectangularly shaped shoes. Usually, when wear occurs and the clearance becomes too great, the old worn-out shoes can be replaced with new ones. In Fig. 46, provision is made for wear adjustment, in that one of the spool flanges is fixed and the other is made adjustable. A flange sleeve is taper pinned to the main shaft, the flange end against the shaft shoulder. The adjustable sleeve is slightly flanged at the right and is adjusted by the two lock nuts at the left.

**The two steel shoes** are rectangular and ride on the ends of shoulder screws. These screws are loosely fitted at the thread into the cast iron yoke and obtain their squareness by the large diameter head size of the screw. The screws are driven in as tight as possible. In this particular assembly, the running clearance between the shoe and the flanges is kept at a bare minimum because excessive clearance might have an effect on the work.

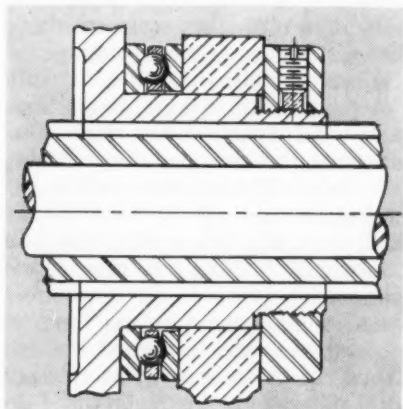


Fig. 45—This lever type shifting shoe is connected to a shaft parallel to axis of assembly.

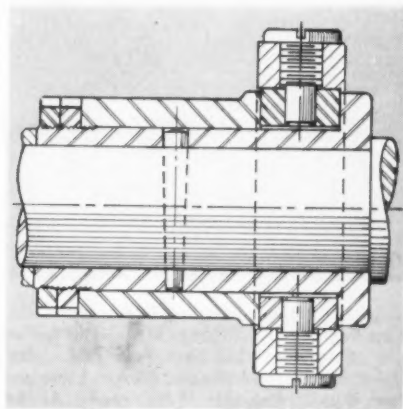


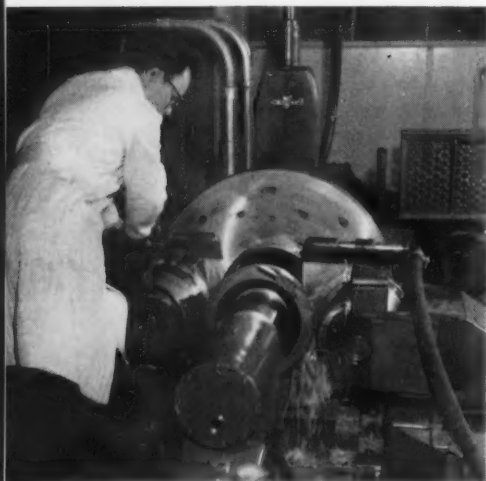
Fig. 46—In this shoe assembly, one spool flange is fixed; the other is made adjustable.





## aircraft components

**Solar Aircraft uses new machine tool to squeeze cold alloy steels into desired shapes, reducing production time and costs.**



*This new machine tool, installed in Solar Aircraft Company's San Diego plant, is a Hydrospin machine, which squeezes cold alloy steels into desired shapes. The machine rotates blank metal discs at high speed. As the disc spins, the two steel rollers shown at the sides force the disc into a conical or contoured shape. Most machine actions are automatic.*

By J. A. LOGAN  
Chief Production Engineer, Solar  
Aircraft Company

**A giant new machine tool** that squeezes cold alloy steels into desired shapes and that is capable of reducing production costs on many difficult-to-form aircraft components has been installed in Solar Aircraft Company's San Diego plant. The unit, which is known as a Hydrospin machine, is valued at about \$100,000, weighs 32 tons, and was shipped on freight cars to Solar from Cincinnati, Ohio, where it was built by The Cincinnati Milling Machine Company.

In the Hydrospin machine, a blank metal disc is rotated at high speed. As it spins two heavy duty steel rollers force the metal disc into the desired shape, while the rollers advance along a preset course. The



*"... the machine has successfully formed 1-inch thick mild steels and 3/4-inch stainless steel."*

machine is semi-automatic — once the adjustments are set by an operator, various steps in the work cycle proceed automatically, except for loading and unloading. The machine is almost completely hydraulically controlled, thereby giving it tremendous power plus unusual flexibility.

Solar will use the Hydros핀 machine to manufacture jet engine and other high temperature parts, such as jet exhaust cones. In operation, the Hydros핀 employs two opposed rollers which force the material being worked to cold-flow onto a rotating mandrel. Pressure is obtained from four 25-ton hydraulic cylinders, two of which operate at 2000 p.s.i. and two of which operate at 1000 p.s.i. Stock up to 42 inches in diameter can be handled, and the machine has successfully formed 1-inch thick mild steels and 3/4-inch thick stainless steel. At Solar a 5-ton bridge crane services the machine.

A major use for the Hydros핀 machine is the production of dome-shaped contoured aircraft components. Previously, these parts were fabricated in two sections and then welded together, requiring the use of both special dies and fixtures. On the Hydros핀 machine they are simply formed from a blank disc such as that shown in one of the accompanying illustrations. On many parts, only one-fourth as much material is required to Hydros핀 the part as to produce the same type of part

from a forging, and production time is much less.

Another advantage of Hydros핀ning is that parts turned out are unusually strong, with maximum resistance to fatigue failure. When metal is Hydros핀ned, it undergoes a shear deformation, greatly elongating the metal's grain structure. The deformation results in work hardening of the metal and an increase in tensile strength. The resulting surface finish is claimed to be excellent and is also said to give the part unusually high fatigue resistance.



*J. A. Logan, chief production engineer of Solar Aircraft Company's San Diego plant, examines a spun metal cone produced from a simple disc of metal like the one he is holding. The cone was fabricated on Solar's Hydros핀 machine, a giant new machine tool that squeezes cold alloy steels into desired shapes and is designed to reduce production costs.*

# Hidden-Arc Welding

***This report, based on a Mechanical Design Competition award paper, covers both an interesting design and clever fabricating angle employed in producing large dresser reels for the textile industry.***

**Redesigning for welding** need not always involve a change from an alternate type of construction. Frequently, a more efficient welding technique may be developed which at once improves the product or makes its manufacture more economical.

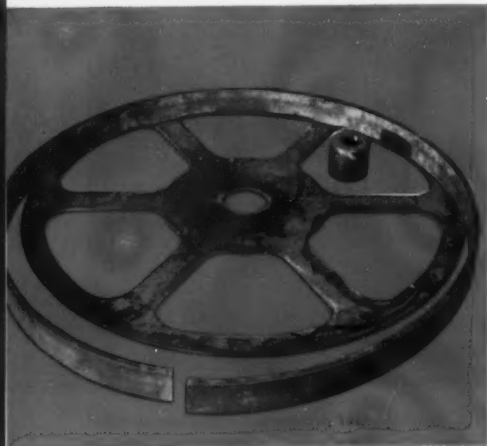
The foregoing proved true in the fabrication of large dresser reels or drums used in the textile industry in conjunction with wool spinning

frame bobbins or with rewound cones in a magazine creel. These reels comprise a series of spiders mounted on a shaft, over which is fastened a sheet steel skin. A typical size is 46 inches in diameter and 184 inches long, weighing over one ton. Operating speed varies, but averages around 113 revolutions per minute.

These reels have always been welded steel assemblies. The previous method of construction was to punch some 300 holes in the 14 gauge sheet steel skin and then to make plug welds through them to flanges on the spiders and to T-iron reinforcing strips located between the spiders. This had to be followed by flush grinding each plug, since the outer surface must be entirely smooth.

At best a rather cumbersome procedure, it has now been revised to include tack welding the T-sections and spider flanges to the inside surface of the skin and then automatically welding the girth and longitudinal skin seams by the hidden-arc method. Tack welds are 1 inch long, spaced 10 inches apart and staggered from one flange to the next.

**The improved design** was worked out by the Whitin Machine Works, Whitinsville, Massachusetts, under



**Fig. 1**—A rolled steel flange, a flame cut web plate, and a 5-inch round hub are 100 per cent welded to make spiders which are subsequently welded to the dresser reel shell.

# Improves Reel Design

supervision of John F. Sloan, welding engineer. His report on the project constituted a prize-winning effort in the Mechanical Design Competition of The James F. Lincoln Arc Welding Foundation, Cleveland, Ohio.

As shown in Fig. 1, the reel spiders are made up of three sections each — a flange of 4 x  $\frac{5}{8}$ -inch bar stock rolled to the required diameter, a web of  $\frac{3}{8}$ -inch plate flame cut to shape, and a hub sawed from 5-inch round bar stock. These sections are assembled for tack welding and then checked dimensionally and positioned for automatic welding. A semi-automatic welding head was converted to full automatic operation by means of a work positioner and rigid mounting for the head, as shown in Fig. 2. Speed of travel around the flange of the reel averages 18 inches per minute and the entire assembly is 100 per cent welded.

**Following straightening** in a 200-ton press, the spider is stress relieved before mounting on the shaft. Spaced between the spiders are circular 1 $\frac{1}{2}$ -inch T-section steel strips having the primary purpose of supporting the shell on operational loads. They are roll formed in the shape of a helix, after which each complete circle is cut from the helix and left unwelded ready for assembly.

The sheet steel shell is sheared square and cut to length and width, following which a row of "key holes"

is laid out for punching. Length is left somewhat on the plus side to compensate for variations developing in rolling to cylindrical shape, so that the seam or gap at the ends shall not exceed 1/16 inch. Three of the rolled sheets make up one shell on the 184-inch reel. A cone arrangement, formed from 11 gauge sheet, is welded to one end of the shell. The angle of this cone to the cylindrical section must be held to close limits.

Finished spiders are assembled and keyed to a ground shaft in a floating fixture, as shown in Fig. 3. The unit is then checked to insure against sag in the shafting. The skin sections then are next rolled

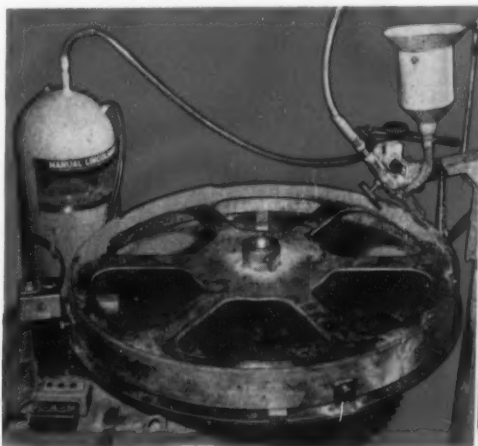


Fig. 2—Three spider sections are tack welded and clamped in a work positioner which moves the flange joint under rigidly mounted hidden-arc welding head for automatically welding.

*"The total length of all welds per cylinder is 246 feet."*

onto the spiders, one at a time, a further check on shaft alignment being made before each sheet is tack welded to the spiders and T-sections.

**Automatic hidden-arc welding** is used to complete the seams in the shell members. As illustrated in Fig. 4, the welding head is a straight tube arrangement mounted in a conventional burning torch through which the electrode wire is fed. Attached to one side is a flux storage hopper. This entire unit is rigid and

the cylinder is rotated under it by means of a gear reduction unit and belt.

Each girth seam is continuously welded its entire length and is backed up by a spider flange, preventing burn-through. Longitudinal seams are welded in similar fashion, using the same equipment mounted on a No. 10 Radiograph running on a track for the length of the cylinder. The total length of all welds per cylinder is 246 feet.

Final operations include grinding

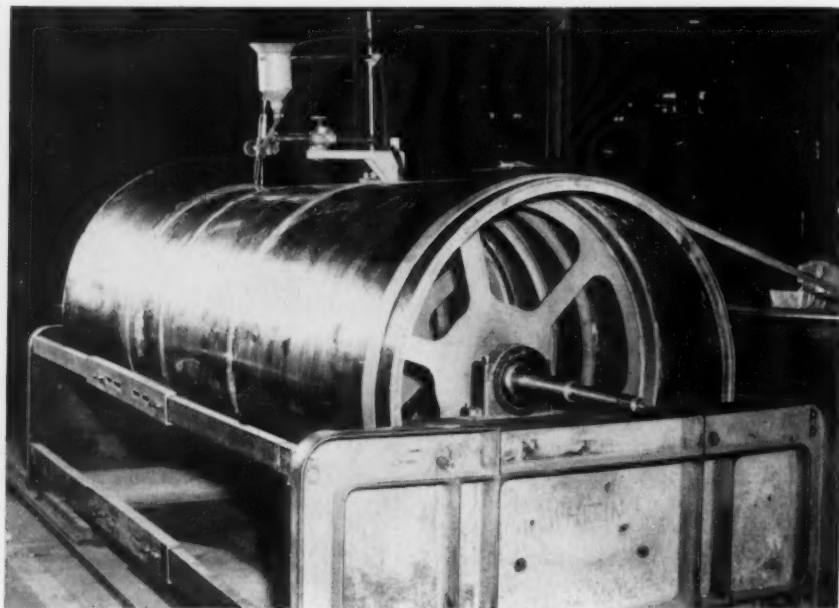
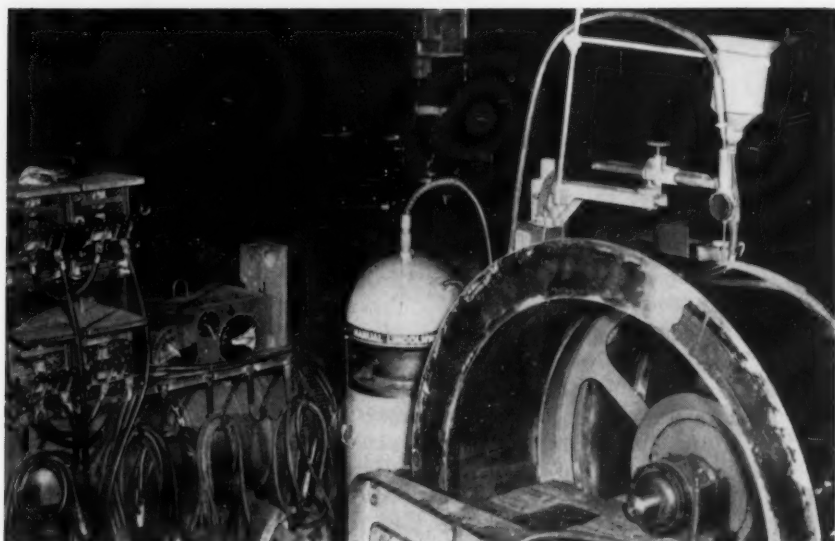


Fig. 3—After tack welding the spider flange and the intermediate T-section supports to the shell, the unit is rotated in a floating fixture

under an automatic hidden-arc welding head for the purpose of making the girth seams, which are backed up by the spider flanges.



*In this view, the automatic hidden-arc welding head is shown making a girth seam at an end where a flared section is joined to the*

*steel cylinder. Longitudinal shell seams are also made by means of this automatic welding head as it moves along an overhead track.*

all welds smooth and flush, along with removing burrs before a final dimensional check. A typical inspection shows a runout on the face of the spider hub of only 0.017 inch;

on the brake i.d. area, 0.002 inch; average on the o.d. of the cylinder cone section, 0.090 inch; and on the o. d. of the main shaft at either extreme end, 0.0025 inch.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

**Limit-Type Gages.** The Sheffield Corporation has released a new catalog and manual (No. LTG-54) covering its line of standard gages. Sectionalized and spirally bound, this booklet provides a rapid and convenient method of locating information needed by the gage engineer or the gage buyer. It is divided into six sections which include data on plain cylindrical plug gages; taper plug and ring gages and mas-

ter setting discs; plain cylindrical ring gages; adjustable limit gages; thread gages; miscellaneous thread checking equipment; pipe thread gages; and engineering data and specifications. Distribution of the catalog will be through Sheffield district offices to qualified personnel in the metalworking industry. However, requests should be addressed to The Sheffield Corp., Dayton 1, Ohio.

# Tape-Controlled Boring

*Application of the punched-tape principle of automatic operation to a boring machine producing instrument gear trains is outlined.*

By JOHN RUDOLPH

**The punched-tape principle** of automatic operation has been applied to a precision boring machine used in the production of instrument gear trains. A system worked out by Minneapolis-Honeywell Regulator Company includes a standard four-spindle Ex-Cell-O precision boring machine modified with built-

in electronic controls and circuitry and a tape "reader" housed in a specially-built control cabinet.

Hole coordinates and feed instructions are punched on the tape by a perforating machine similar to a typewriter. Electronic signals from the tape regulate the linear travel of the boring machine's hydraulic cross



*This illustration shows an overall view of the tape-controlled automatic boring machine. In the foreground, an operator uses a perforating machine similar to typewriter, to punch hole coordinates and feed instructions on the tape.*



*Operating instructions are punched on a tape and feed through the "reader" housed in the specially-built control cabinet. Electronic signals from the tape, shown being inserted in "reader," regulate boring machine operation.*



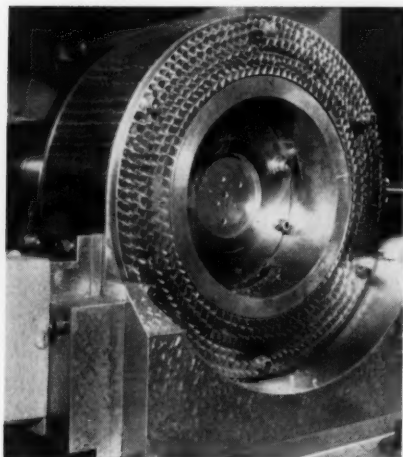
slide and the rotary motion of a specially-designed holding fixture mounted on the cross slide. Tape preparation requires approximately five minutes per hole, and complete changeover from one part to another can be accomplished in about 30 minutes.

To set up for automatic operation, the proper adapter ring is attached to the rotary fixture, cutting tools are mounted in the four spindles and the punched tape is placed in the "reader" of the control circuit. After inserting a blank piece in the fixture, the operator merely presses a button to initiate the automatic tape-controlled cycle. After the machine has "read" the complete strip of tape, it automatically stops to permit removal of the finished part.

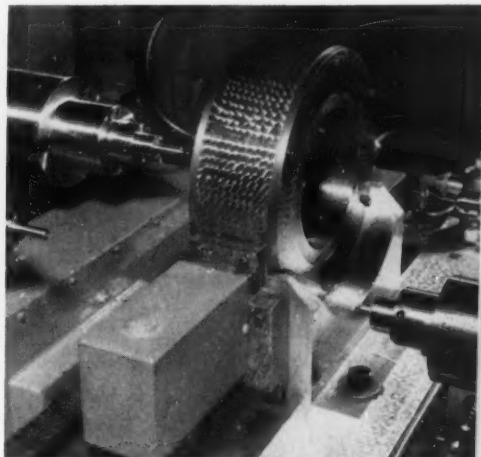
Designed for boring shaft holes in gear plates in which the center-to-

center hole tolerances must be close to prevent binding or backlash, the machine is adaptable to a variety of hole patterns and sizes. Different piece parts can be handled merely by changing the adapter ring and inserting the appropriate tape. Where a small number of special plates is needed, the machine can be manually operated by adjusting 10 knobs to control linear travel of the cross slide and rotary motion of the holding fixture. Manual control knobs are located in the control cabinet.

In either manual or tape-controlled operation, coordinate information is fed to the machine in increments of 0.0001 inch over the 8-inch linear range and 0.01 degree over the 360-degree rotary range. Accuracy is claimed to be better than plus or minus 0.0005 inch.



*Center-to-center hole tolerances in bored gear plates must be close to prevent binding or backlash. Holes of various sizes have been machined in the particular workpiece shown here, which is held rigid in a rotary fixture.*



*The loop plastic tape sends out electrical impulses to regulate the linear travel of the machine's hydraulic cross slide (lower left) and the rotary motion of the holding fixture (center) which is mounted on the cross slide.*

# tax tips for your

## machine shop

**Recent rulings of the Internal Revenue Service outlined to help you with your income tax problems.**

By H. E. CARROLL

As anticipated when the new Income Tax Code was passed last year, there have been revisions and rulings that have a bearing on the operation of your machine shop. Here are some of the more important rulings, recently passed, that affect your machine shop's tax planning:

### DEPRECIATION POLICY

Due to the changes in the Internal Revenue Code of 1954 on the depreciation provision, many questions have been raised. Section 167 established new methods of calculating depreciation for your equipment: (1) the double-declining balance method and (2) the sum-of-the-digits method.

Bulletin "F", the Internal Revenue Service's official schedules for useful life of equipment, was pre-

pared in 1942. The Service recognizes that some of the schedules of useful life for assets are out-of-date. Times have changed and some of the useful life terms are too long — some too short. As a result, Bulletin "F" will be revised as soon as the Service completes a comprehensive and extended survey of the depreciable life of many types of equipment.

In the meantime, the Internal Revenue Service has this policy:

"It will be the policy of the Service generally not to disturb depreciation deductions, and Revenue employees will propose adjustments in the depreciation deductions only where there is a clear and convincing basis for a change."

Even though Bulletin "F" is not current in every respect, it can still be used as a guide. It is not manda-



tory to use these schedules for determining the useful life of your shop's equipment. Bulletin "F" was developed to be a *guide* to help you determine reasonable normal periods of useful life for your assets.

You may still set your own period of time for figuring your depreciation. Internal Revenue Bulletin No. 8.55 says:

"... on the basis of their particular operating conditions, experience, and informed judgement as to technological improvements and economic changes."

However, any period of depreciation you establish is still subject to review by the Internal Revenue Service. You should be prepared to substantiate the periods you use for the useful life of your machine shop's equipment.

**Suggestion:** Use Bulletin "F" as a guide for estimated useful life of your equipment. But, rely more on your own experience for the figure

you use as the basis for your depreciation deduction. When the new, revised Bulletin "F" is issued, check it to see if your program of depreciation is in line with the study which the Internal Revenue Service is currently making.

## REMOVAL OF BUILDINGS

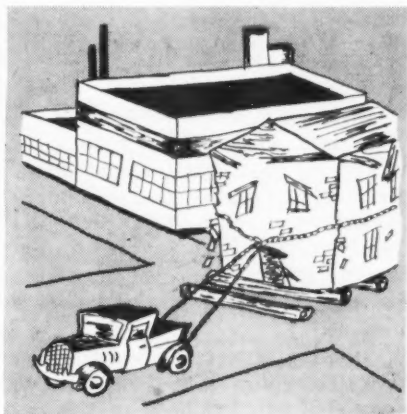
The Internal Revenue Service in Revenue Ruling 55-110 covers the removal of buildings from property. According to this recent ruling:

1. Removal costs constitute a part of the basis of the land acquired.
2. The value of the property must be reduced by any payments received from the sale of old buildings on the land.

As a case in point, a machine shop buys a piece of land for \$20,000 to expand its business. This land has an old building on it which is of no value to the machine



"... check to see if your program of depreciation is in line with the study which the Internal Revenue Service is currently making."



"... you cannot count the removal expense of buildings from property that was recently acquired as a current operating expense."

**Recent estimates indicate that the government will lose more than one billion dollars in revenue . . .**

shop in the conduct of its business. It is removed from the property at a cost of \$1,000. Thus, the machine shop has an investment of \$21,000 in the recently acquired property.

If, however, the machine shop sells the demolished building after removal from the property for \$2,000, this amount is deducted from the net cost of the property. Thus, the new value of the property is \$19,000 calculated as follows:

Cost of property . . . . .	\$20,000
Plus: Cost of removal . . . .	\$ 1,000
	<hr/>
	\$21,000
Less: Sale of building . . . .	\$ 2,000
	<hr/>
	\$19,000

**Remember:** You cannot count the removal expense of buildings from property recently acquired as a current operating expense. But, you do not count what you receive for the sale of the building as current income.

#### **ANTICIPATED EXPENSES**

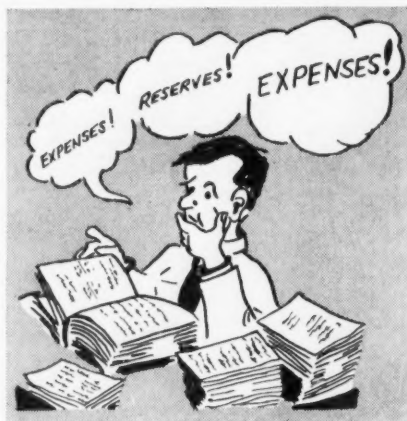
Machine shops keeping records on an accrual basis have a golden opportunity to realize double deductions this year. This is accomplished through establishing reserves for expenses. Under the provisions of the Revenue Code of 1954, this saving is possible.

Recently, however, Treasury Secretary Humphrey asked Congress to close this tax loophole in the tax bill passed in 1954. In a letter to Rep. Cooper, Chairman of the House Ways & Means Committee,

Mr. Humphrey recommended that provisions 452 and 462 be repealed retroactively.

Recent estimates (tremendously exaggerated according to some authorities) indicate that the government will lose more than one billion dollars in revenue through this one change. However, it is indicated that many businessmen are planning to take advantage of this provision to a greater extent than was anticipated when the bill was passed.

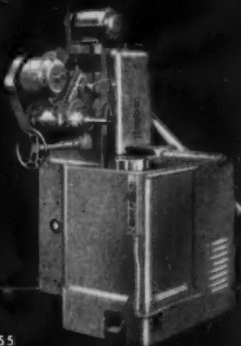
Briefly, this provision permits a machine shop operating on an accrual tax reporting basis to deduct not only actual expenses for the year, but also a reserve fund set aside for estimated expenses in later years growing out of activities



**"Machine shops keeping records on an accrual basis have a golden opportunity to realize double deductions this year . . . accomplished through establishing reserves for expenses."**

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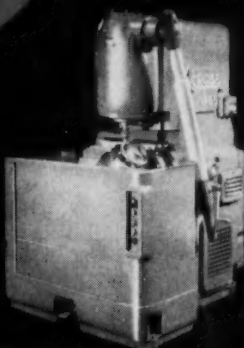


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8 pitch 30 tooth gears—55 net hourly

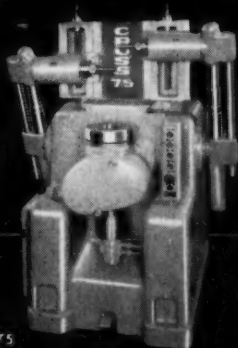


NO. 65

For pointing or chamfering external and internal—

clutches • spur gears  
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Typical production—pointing 10 pitch 30  
tooth gears—100 net hourly



NO. 75

For burring or chamfering both ends at the same time—

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*"Take advantage of this provision . . . you will be able to realize some tax savings now."*

on which income was earned this year.

When the Internal Revenue Code of 1954 was passed, the objective of these sections was to make tax book-keeping and regular business book-keeping conform better. Since this provision will account for greater savings, it will probably get top priority in proposed tax revision in Congress.

**Suggestion:** Take advantage of this provision. Even if the law is changed

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★



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Executive Vice President,  
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on a retroactive basis, you will not lose any tax dollars. And, if it is changed without the retroactive clause (which would add further complications to the law according to many tax experts), you will be able to realize some tax savings now.

★ ★ ★

**Titanium in Iron and Steel.** By George F. Comstock. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 294 pages. Illustrated. Cloth binding, board covers. Price, \$6.00.

This book reviews and correlates all the important data in world literature on titanium as an alloying element in iron and steel. Nearly 300 papers (listed in the bibliography at the end of the book) were reviewed for the manuscript. The book makes it unnecessary for engineers and research workers to go back to the original literature for information on the element. Opening with a general discussion of titanium and its minerals — principal sources, concentration, preparation, and so on — the book goes on to examine the properties and effects of the element as an addition to cast iron and steel. Its deoxidizing effects are discussed in full. Special emphasis is placed on its unique effects in stabilizing nitrogen and in fixing carbon in alloys where other carbides may be undesirable, on its usefulness in steel which is to be enameled, and in certain complex ferrous alloys for high-temperature application.





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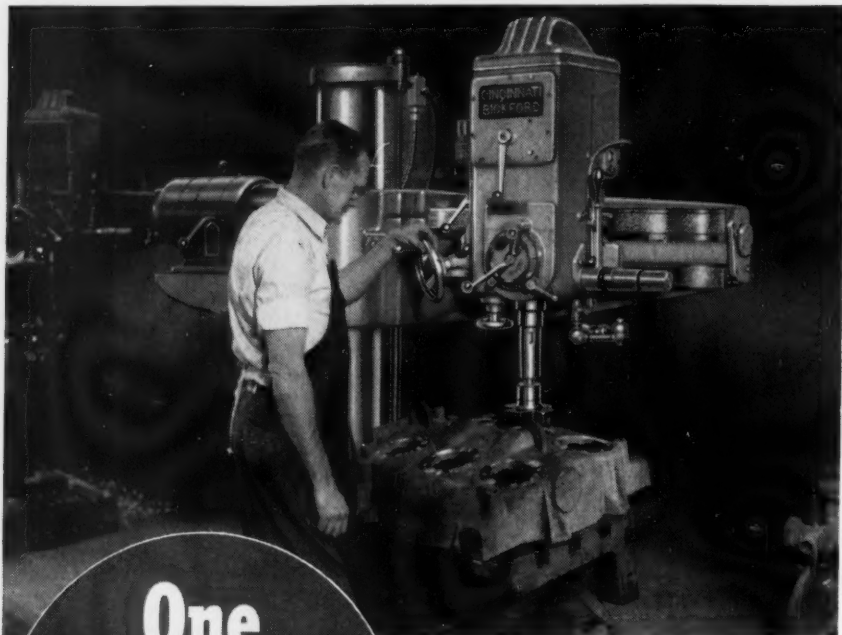
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May, 1955

modern machine shop 135



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set-up saves  
30%**

*Photos courtesy of the Kelman Electric & Mfg. Company, Los Angeles, California.*

Boring, facing, and high speed drilling with one set-up cut the floor to floor time about one-third on this job.

The Kelman Electric & Mfg. Company say their Cincinnati Super Service Radial Drill "handles easily, is very accurate and versatile."

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The part being processed is a Bronze Top Casting.

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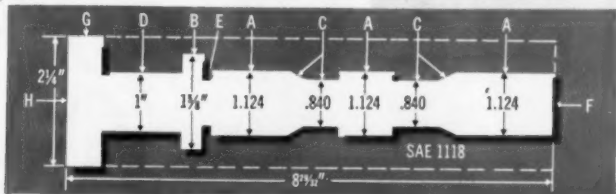
**IN 1947**

this job took...

**11.50 min.**

FLOOR TO FLOOR

- A. Turn — 694 RPM — .015" Feed
- B. Turn — 489 RPM — .015" Feed
- C. Form — 119 RPM — .0025" Feed
- D. Form — 119 RPM — .0025" Feed
- E. Face, shoulder, neck, undercut, HSS
- F. Face 243 RPM — .0035" Feed
- G. Knurl
- H. Cut off — 243 RPM — .0035" Feed



**IN 1954**

this same job takes...

**5.00 min.**

FLOOR TO FLOOR

- A. Turn — 1000 RPM — .022" Feed
- B. Turn — 1000 RPM — .022" Feed
- C. Form — 340 RPM — .0035" Feed
- D. Form — 340 RPM — .0035" Feed
- E. Face, shoulder, neck, undercut
- F. Face 489 RPM — .0035" Feed
- G. Knurl
- H. Cut off — 489 RPM — .0035" Feed

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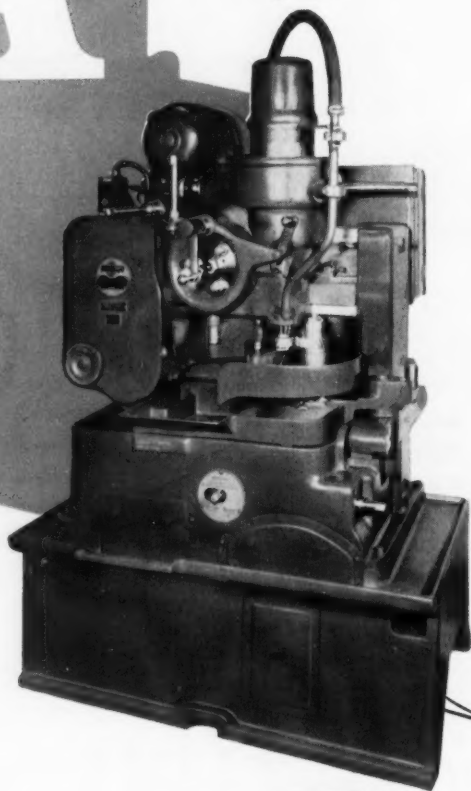
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**FAST SET-UP** ...and rapid change-over allows you to get more production. Especially advantageous for shops handling short runs.



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TRY THESE HELPFUL WAYS TO DETERMINE THE  
CHARACTERISTICS OF MIXED-UP STEELS IN YOUR SHOP!

.....

## Practical Methods of Steel Identification

***The information presented in this two-part article is particularly applicable to those shops where highly diversified manufacturing operations are performed and where problems revolving around mixed steels tend to become sizable.***

By HOWARD E. BOYER

**There is little doubt** of the fact that as long as steels are handled by human beings there will continue to be mix-ups encountered even under the best systems of control in use today. In some steel fabricating shops where only a few different types of steel are regularly handled, a means of keeping them from becoming mixed is not usually any major problem, but in the shops where a highly diversified type of manufacturing is carried on the problems revolving around mixed steel become sizable.

It is not unusual to find manufacturing plants which regularly employ the use of several dozen different compositions of steel ranging from low carbon screw stock up through higher carbon and alloy constructional steels to stainless and

other highly alloyed materials. Furthermore it is perfectly normal that these steel bars or other shapes will exist in the same physical size, but in a variety of compositions.

Actually, when one considers how many times steels are handled under the direction of human beings, from the time they are finally finished in the mill until the completed parts are fabricated, it seems amazing that the problem of mixed steel is not an even bigger one. At times the author cannot help feeling that transportation companies must secretly organize so that a number of steel compositions of the same size will be delivered at the same time even though they were ordered from different sources at different times.

When a load of steel arrives in any plant receiving department,



which is always a busy place, it must be identified and stored quickly. When different compositions of the same size are delivered in one load it is easy to visualize how easily a mix-up can occur, particularly when one or more bundles have become broken in shipment. Accurate identity may be difficult even for the experienced hand at that time and it is a certainty that the personnel who are handling steel in such places are not trained so that they fully realize the importance of keeping the various compositions separated. The foregoing discussion merely emphasizes one place in the handling sequence where it is easy for a mix-up to occur; there are many other such fertile spots which are difficult to avoid.

The task of providing a practical and universally accepted marking system for steels has been given a great deal of study by many individuals, as well as by technical or-

ganizations. Paint coding has been the most widely used method as of the present time. Unfortunately nature did not provide enough colors or even workable color combinations for anywhere near all the steels in use today, so the result is that every warehouse and user have adopted a color coding system covering the particular types of steels which they sell or use. Such a system works well within one plant or warehouse, but is, of course, worthless when the steel is removed elsewhere.

**This treatise** is not intended as a discussion on marking systems for there are a number of workable methods, including the various means of paint coding, stamping by machines, and so on. Since the author is one of the many who has given a great deal of time to the study of marking systems, the readers may be assured that any revolutionary method relative to

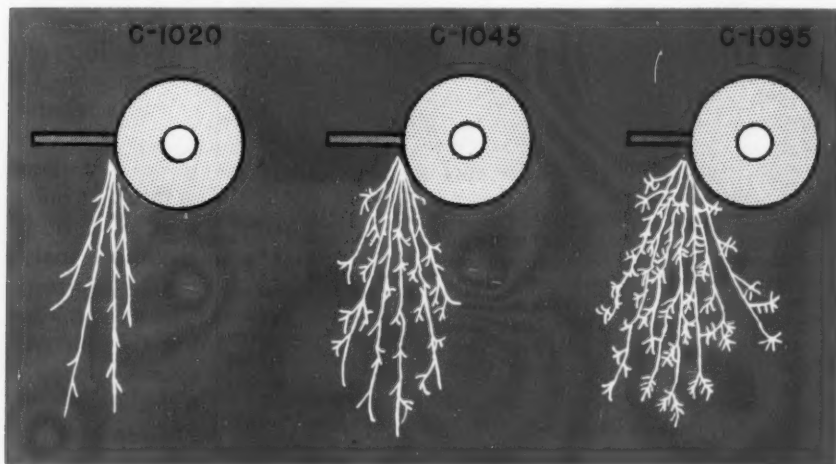


Fig. 1—Spark patterns exhibited by certain steels containing various percentages of carbon.

**"... it is necessary to establish the identity of certain steels."**

marking would have already been made known through publications.

Therefore, it will be assumed at this point that the plant attempts to enforce the use of a good marking system which is certainly a major

contributing factor toward minimizing the chance of mixed compositions. In spite of the best house-keeping, however, mix-ups always have occurred and they will no doubt continue to do so.

Thus, it is a settled fact that at some time or other it is necessary to definitely establish the identity of certain steels, either because they

have lost their identity or because some evidence of a mixed condition has presented itself. Just how to accomplish this without the cost exceeding the value of the material is usually no small problem, particularly in plants where complete metallurgical laboratory facilities are not available. Of course a reliable means is to sample all of the bars or billets in question and have chemical analyses performed. The cost of doing this on any extensive scale usually precludes such a procedure. In the first place

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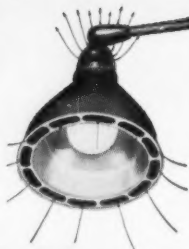
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it is quite a costly procedure to extract the samples and in the second place the cost of having many analyses performed by means of commercial laboratories would run into sizable figures.

**In larger plants** which possess spectrographic equipment the task of sorting bars, billets or even semi-finished parts becomes relatively simple. The sampling for such methods is simple compared to taking samples for wet analysis plus the fact that many analyses can be made on a single spectrographic plate at a relatively low cost. The fact that spectrographic methods are usually non-destructive is an additional advantage when the sorting of machined parts is concerned. It is true that the spectrographic

plate does not show carbon percentage, but this element can usually be estimated by some satisfactory means. For the most part, however, sorting steel by this modern means is wishful thinking for such an installation represents a major investment which is beyond the reach of most plants engaged in metal fabricating operations.

A great deal has been accomplished along the line of sorting steels by means of instruments which take advantage of variations in certain electrical properties of different steels. Instruments of this type are far less costly compared to spectrographic installations, but even they involve the expenditure of considerable money and there is no doubt of the fact that they leave a great deal

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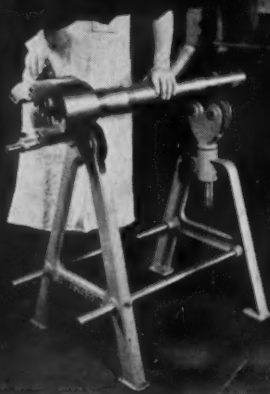
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CAPACITIES		
Swing	Between Standards	Weight Capacity
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21 in.	20 in.	800 lbs.
43 in.	29 in.	800 lbs.
43 in.	29 in.	2,000 lbs.
6 ft.	5 ft.	5,000 lbs.
8 ft.	8 ft.	10,000 lbs.
Any	Any	24,000 lbs.
43 in.	30 in.	800 lbs.

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**"... sorting steel by the flux density principle."**

to be desired. In the first place any method of this type is strictly a comparison so that a wide range of known standards is required before any progress can be made in sorting steels. In the second place the process is influenced by so many variables other than composition so that a great deal of care must be used in making decisions with this type of instrument furnishing the data.

**One of these methods** which has been used with varying degrees of success is that of sorting steel by means of the flux density principle. Equipment for this method of testing is less costly than the type required for sorting by some electrical principles, but the limitations are even greater. In the first place the specimens must be exactly the same in physical size and shape. Furthermore the flux density of non-heat treated steels does not vary sufficiently so as to facilitate a clear cut result. This latter method is generally more useful for determining variations in heat treated structures.

It is true that there have not, as yet, been any tricks of magic developed by which the inexperienced can quickly separate different steel compositions. There are a number of quick tests which can be made with a minimum of equipment and experience and will provide a great deal of working information. For the most part any single one of these tests is insufficient, but when two or

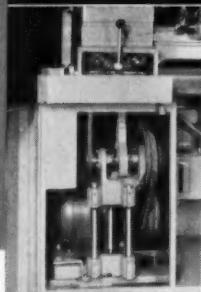


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May, 1955

modern machine shop 147

**"... the spark test is probably the most widely used ..."**

more of these tests are used in conjunction with each other a fairly accurate idea of the steel composition can usually be gained.

Of all these quick tests the spark test is probably the oldest and still the most widely used today. Spark testing is still performed in steel mills in spite of all the modern metallurgical equipment possessed by these plants. Mills and warehouses have people who are thoroughly experienced in the art of spark testing, mainly because many checks can be made quickly, thus adding assurance against mixed bars or billets.

Several elements can be esti-

mated to some degree by means of a spark test; that is by observing the pattern of sparks given forth when the steel is held against a high speed grinding wheel. Carbon is the easiest to determine, which is fortunate, for carbon is usually the most important element. Proper equipment and a little experience can be employed to determine carbon percentage within plus or minus about 0.05 per cent in straight carbon or low alloy steels.

**Figure 1** shows the spark patterns which occur from steels of three different carbon ranges as shown. It will be noted that C-1020, which is a steel with a nominal carbon content of 0.20 per cent, throws a stream with only a few forks. A medium carbon steel, such as C-1045, shows numerous secondary bursts,



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modern machine shop 149

**"As alloying elements increase,  
spark pattern is disturbed . . ."**

while the C-1095, a much higher carbon steel, shows a vivid pine tree effect in the spark pattern.

Carbon percentages in between those shown in the illustration may be estimated quite closely by the

use of known standards as a means of comparison. As the percentage of alloying elements increases the carbon spark pattern does become disturbed to some extent. For example, the element tungsten, when present in any appreciable amounts, will give a dark red burst of lines which obliterate the characteristic patterns of other elements. It is correct to assume that spark testing is an

art to a great extent, although it can be learned by practically anyone with normal eyesight. It is virtually impossible to describe the many different patterns given forth by the many compositions. Figure 1 is merely an example of some simple patterns.

Aside from experience in detecting characteristic spark patterns there are other important phases which must be given consideration. Since there are, at the best, many variables connected with any test of this nature it is best to keep as many factors constant as possible. Good



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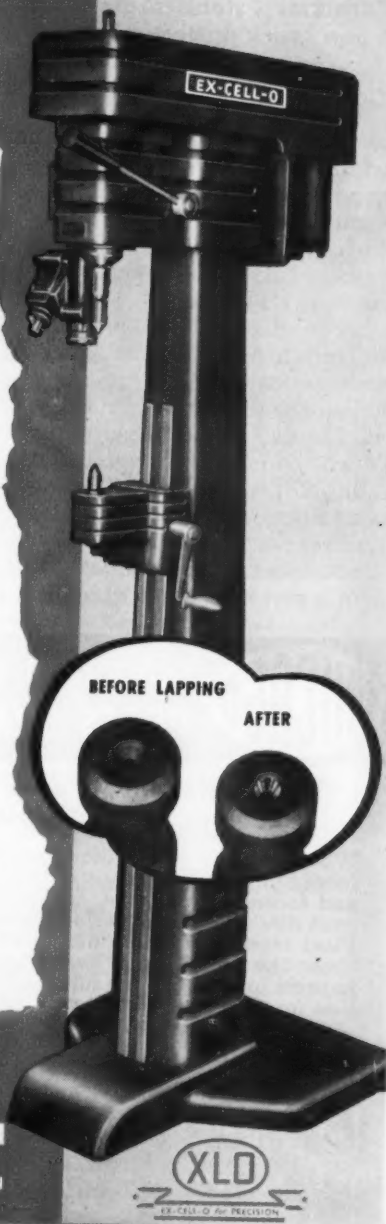
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May, 1955

modern machine shop 151

**"Carburized steels show higher carbon spark pattern . . ."**

equipment is a prime necessity; not just any grinding wheel will suffice for good results. The wheel should be small and mounted on a motor which will turn it relatively fast. Speeds of 3500 to 4500 r.p.m. are preferred. The wheel should be rather coarse; a wheel equivalent to the Norton A46-PV is excellent for most general purpose testing, including the testing of hard steels. A wheel equivalent to the Norton A46-SV will be found more suitable for testing soft steels. All testing should be conducted in a subdued light. If specimens can be brought to a bench it is best to have the grinder mounted in a sort of cabinet which has a

very dark back. It is often necessary to test steel bars in racks, which can be done by means of a portable grinder. In this case it is still necessary that the lighting conditions be guarded carefully so that no direct light will strike the operator's eyes.

**Another important consideration in spark testing** is the surface conditions, which can be most misleading. Steels which have been carburized will naturally show a higher carbon spark pattern on the surface. Most bars or forgings are decarburized at least to some degree on their surfaces so that accurate testing can be performed only on cut or machined areas. Bars are usually tested on the cut ends. Spark tests made on even partially decarburized areas will show low carbon indications, which may or may not be representative. Considering the value of



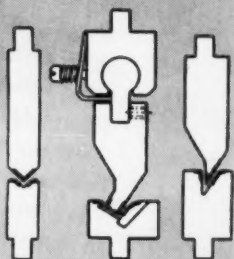
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*"... a most valuable quick test involves a means for estimation of sulphur."*

this old and well known test it seems imperative that every metal fabricating shop should possess the simple equipment required for spark testing and should have at least some members of its inspection department trained to do the test.

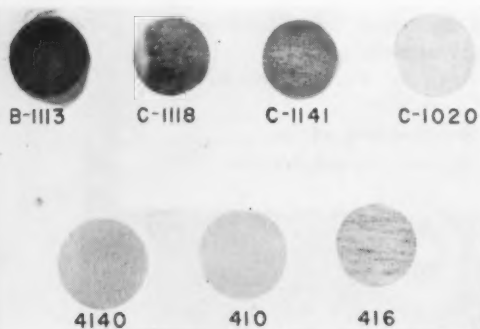
Another simple test which is far less widely known, but is a most valuable quick test, involves a means for estimation of sulphur. It is well known that most of the free cutting steels are so because of the sulphur content. Therefore, it is possible to quickly separate the free cutting grades from the non-resulphurized types. A little practice and care further elevates the value of this test to provide a very close estimation of the sulphur percentage which helps to classify steels in accordance with AISI listings. This test is very simple. It is only necessary to clean free from grease and dirt a reasonably smooth surface such as a bar

end, soak a small piece of photographic paper (any photographic paper even if it has been exposed to light) in a 10 per cent solution of sulphuric acid, drain excess acid from the paper and press it upon the surface to be tested. Allow the paper to remain in place for fifteen seconds and then remove and wash in water. The acid attacks the tiny sulphides in the steel and forms brown spots on the paper.

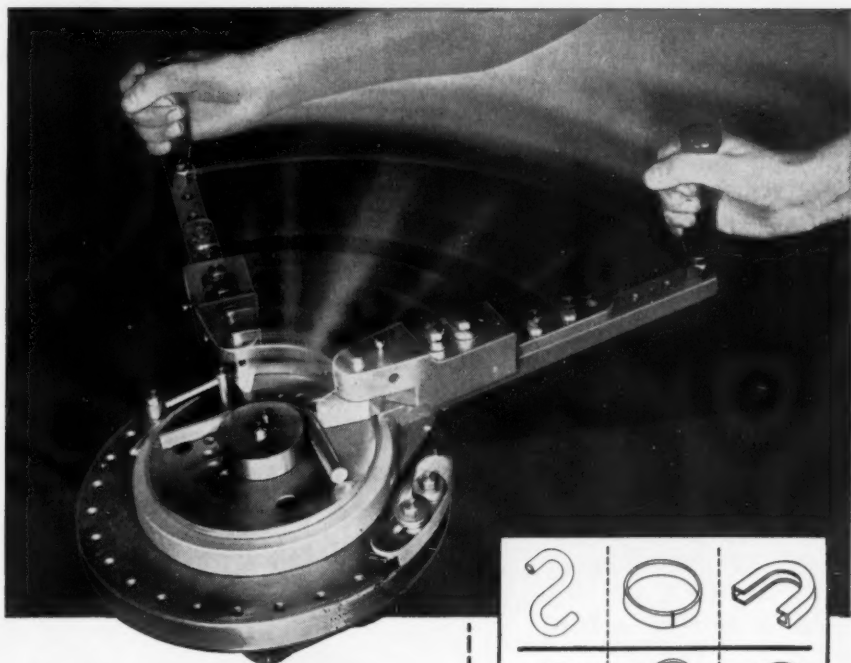
**Figure 2** shows black and white reproductions of several sulphur prints obtained from one inch rounds of several common steels. The B-1113 which contains about 0.300 per cent sulphur registers so positively that the entire spot becomes a deep brown. The resulphurized open hearth steels, C-1118 and C-1141, which contain a nominal sulphur percentage of 0.100 per cent register appreciably, although noticeably less compared to B-1113.

The particular specimen of C-1020 used for this print contained a sulphur percentage of 0.035 per cent the difference being readily distinguishable in the print. The print shown for 4140 characterizes the generally low sulphur content of such alloys, usually about 0.020 per cent by analysis.

It is often desirable to separate Types 410 and 416 stainless which are essentially the same except for the added sulphur in the latter. Virtually no registration of sulphur is shown by the 410, but an obvious positive indication is shown on the print from Type 416.



**Fig. 2**—Reasonably accurate estimations of sulphur percentage can be made by the simple print method shown in this illustration.



## Bend a Variety of Materials

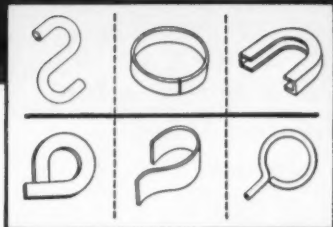
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***"Sulphur printing . . . is also a useful tool for making quick estimations of sulphur in steels."***

Sulphur printing must be done with care, but it requires no particular skill and only a meager amount of practice is required with the assistance of a few known standards in order to obtain a fair degree of accuracy. This method not only serves as a means of identifying certain steels in the shop, but it is also a useful tool in the metallurgical laboratory for making quick estimations of sulphur in steels. This quick test is seldom complete within itself, but when used in conjunction with the spark test discussed in the

foregoing and other methods to be subsequently discussed it is an important contributor.

*(To be continued in next month's issue)*

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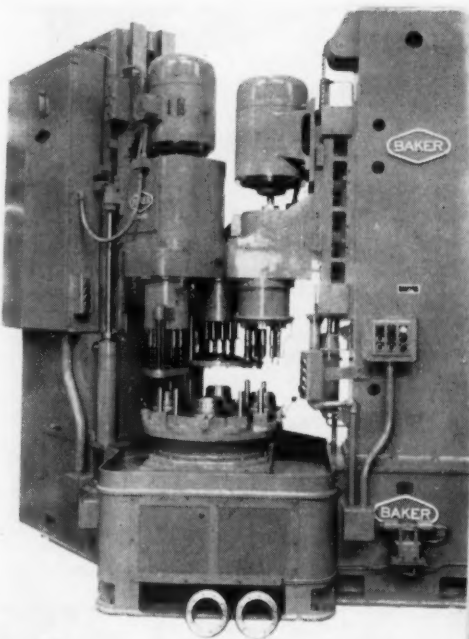
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## **Special Machine Tool Performs Thirty Operations**

**The special machine** illustrated herewith, product of Baker Brothers, Inc., Toledo, Ohio, performs 30 operations on differential ring gears for the manufacturer of a popular make automobile. The machine spot drills to chamber, drills, and taps eight blind holes in steel. Features of the machine include an individual leadscrew taper with magnetic clutch control. The estimated number of parts produced per hour with the machine is 144. The Baker Model 26 HO unit used for the drilling operation features twin pull cylinder construction. Sample parts can be seen at the front of the machine.

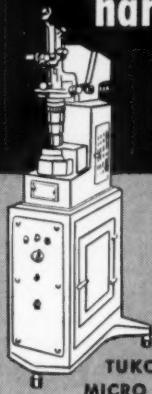
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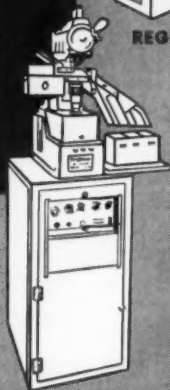
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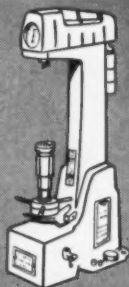
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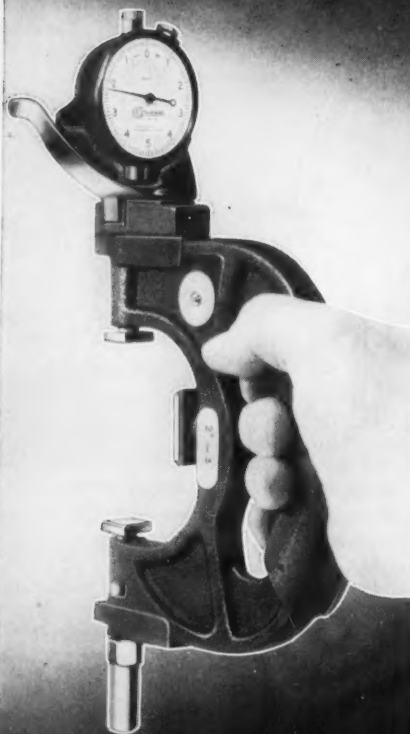
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Other features include adjustable plunger tension; insulated grip; provision for rotating the indicator to face desired direction; and a steel guard to protect it from outside shock. Legs projecting from the guard offer proper support for gage when not in use. An adjustable sleeve-stop in frame limits the travel as desired and protects indicator mounting from distortion due to over-travel. Square anvils are faced with tungsten carbide and back-stops are of nylon (except 0-1" size). Indicator is shockproof and can be furnished with tolerance hands. User may choose from a variety of graduations.

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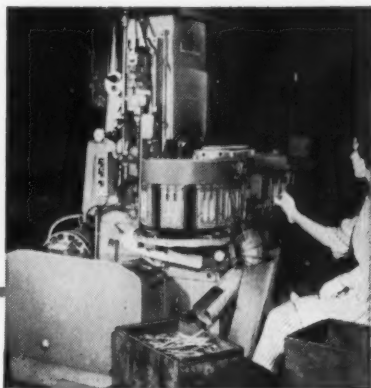
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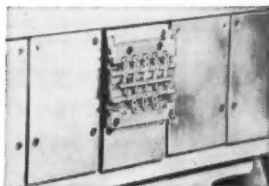


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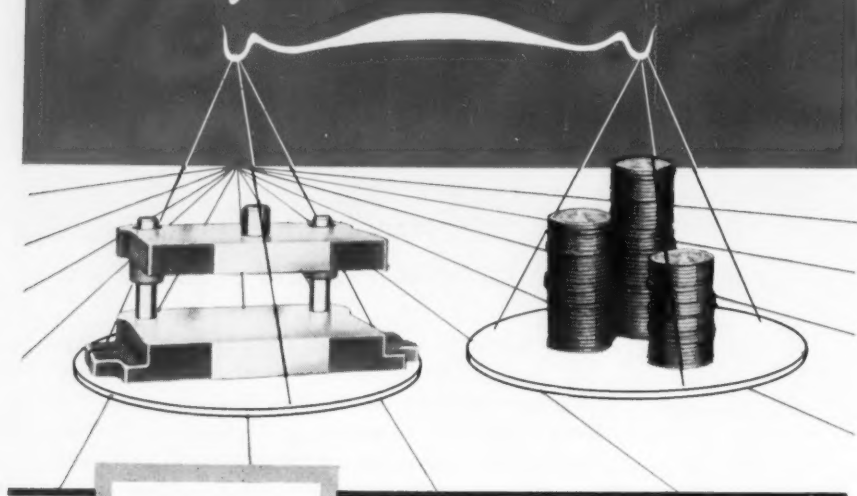
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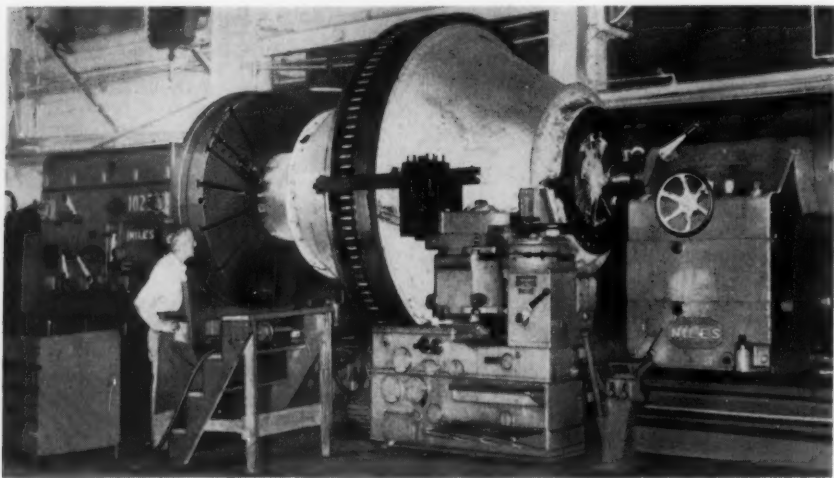
*Machining . . . drilling . . . milling  
. . . sawing . . . splining*

### Repair Shop Machines Crankshafts with 90-Inch Lathe

**Figure 1** shows a 90-inch lathe installed in The Maryland Drydock Company's marine repair shop in Baltimore, Md. The lathe is equipped with factory built and fitted

raising blocks which, when placed under the carriage compound and head and tailstocks, increase the lathe swing approximately 30 inches and provide the versatility of two machine tools. The bottom section of the headstock and center section of the tailstock are the raising blocks.

Designed and built by the Niles



**Fig. 1**—This 90-inch Niles lathe in the Maryland Drydock shop can be given a 120-inch throw by inserting factory built and fitted raising blocks under the head and tailstocks

and carriage compound. Bottom section of headstock and center section of tailstock are the raising blocks, which have been inserted to handle large cement mixer barrel shown.

Tool Division, Baldwin-Lima-Hamilton Corp., Hamilton, Ohio, the lathe also features a removable filler slide plate in the carriage bridge. Maryland Drydock finds this especially helpful when machining the main journals of marine diesel engine crankshafts. It provides that extra swing clearance for large crank throws.

By using the raising blocks and removing the carriage bridge filler, the lathe can be made to machine any job up to 8 feet in diameter and 45 feet long. Rigidity and, therefore, accuracy of the machine with the head and tailstock raising blocks in place is the same as when the lathe is used in the conventional manner.

Another attachment that Maryland Drydock uses to save time in tool adjustment and eliminate inaccuracies from tool chatter when

machining crankshafts is the cross-feed turning bar. It is designed and fitted for bolting directly to the tool rest and forms a solid extension for the tool. With the turning bar in place, the operator can machine the closely confined space of the main journals with only two tool settings. Furthermore, the bar's rigid tool support assures the ability to maintain an accuracy tolerance well within a plus or minus 0.002 inch, it is claimed.

In Fig. 2, the bar is in place and the carriage-bridge filler piece removed while machining a crankshaft section for a 4,000-horsepower 6-cylinder marine diesel.

The lathe has a direct current motor, providing four ranges of face-plate speeds; namely, 0.415 to 1.25 r.p.m.; 1.33 to 3.99 r.p.m.; 4.25 to 12.75 r.p.m.; and 13.55 to 40.7 r.p.m.

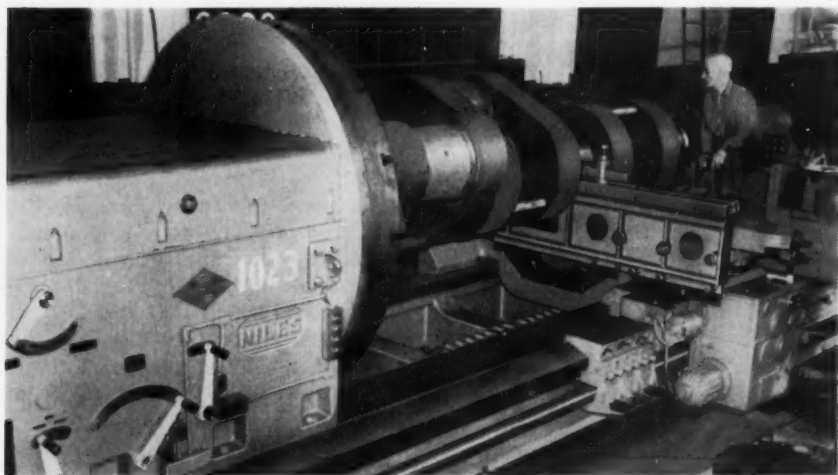


Fig. 2—The 90-inch lathe used in the Maryland Drydock shop is also built with a removable filler slide plate which can be removed from the carriage bridge to obtain increased

clearance at this point for large diameter objects. This feature and the cross-feed turning bar are especially advantageous when machining large marine diesel engine crankshafts.

## modern equipment at work . . .

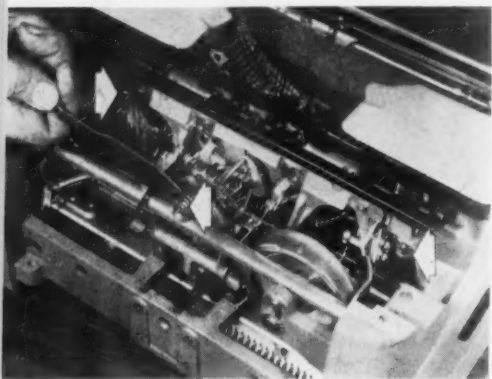
The driving motor receives its power from a direct current motor-generator set.

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★ ★ ★

### Locknuts Allow Accurate Typewriter Adjustments

**Locknuts as adjustable stopnuts** are being used by Underwood Corporation on its new Model 150 standard typewriter to obtain quick, accurate, positive adjustment of motion of the shift mechanism and play of the bearings on the star wheel of the escapement mechanism. Two self-locking nuts are used to adjust the motion of the shift mechanism so that capitals will print on a line



The Flexloc self-locking nuts used on the new Underwood 150 typewriter (shown here with cover removed) make accurate adjustments easy. The nuts are indicated by arrows. The one in the center is used to adjust the bearing on the escapement wheel in order to take up any play without binding the bearing.

with the lower case letters. The escapement mechanism controls the movement of the carriage, causing it to move one space to the left when a key or space bar is struck. One stopnut is used to adjust the bearing.

Flexloc locknuts — made by Standard Pressed Steel Co., Jenkintown, Pa. — were specified in the escapement assembly when Underwood redesigned this mechanism for its new Model 150 standard typewriter, since these nuts, it is claimed, lock in any position without being seated and are not affected by vibration or shock. The purpose of the escapement assembly is to shift the typewriter carriage one space each time a key or the space bar is struck.

Essentially, the assembly works by an escapement wheel engaging a movable dog as the typewriter key or space bar is depressed. The escapement wheel and its shaft are one piece, turning on an adjustable bearing. The shaft is threaded at one end, and the bearing is adjusted by turning a nut against a cone-shaped bearing race.

**To prevent skipping spaces,** the nut must be tightened just enough to take up all radial and end play in the bearing. Yet it must not be tightened so much that it will bind or crack the bearing. Once this adjustment has been properly made, the nut must be held securely in place.

The locknut used in this application has been found to be faster to assemble than the formerly used fastener since only one operation — wrenching — is required. Thus, Underwood is said to save \$1.50 per

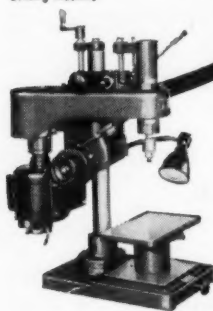


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## **modern equipment at work . . .**

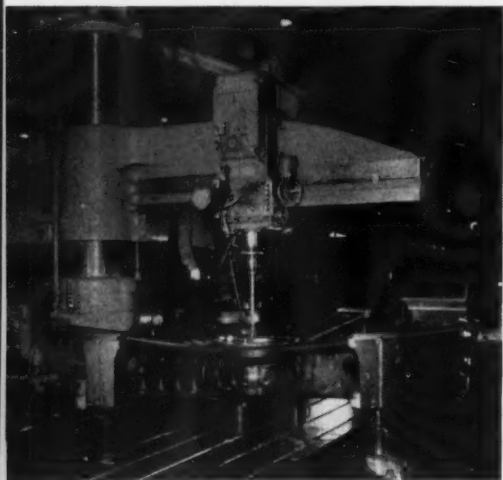
hundred nuts, largely as a result of the faster assembly possible with locknuts.

For more data circle 3 on Reader Service Card

★ ★ ★

### **Radial Performs Honing and Drilling Operations**

**The radial drill with honing attachment** shown in the accompanying illustration is installed in the East Pittsburgh works of Westinghouse Electric Corporation where it is used for honing operations, as well as for conventional drilling. The honing operations involve drill jigs, miscellaneous items and spi-



*This radial drill with honing attachment is used in the Westinghouse East Pittsburgh works for performing honing operations, as well as for conventional drilling operations.*

ders. Holes from 2 to 5 inches in diameter have been worked, although smaller and larger holes can also be handled. The machine will hone blind or through holes and has a 5-inch minimum and 24-inch maximum stroke. Although Westinghouse requirements call for only a 12 to 15 micro-inch finish, it is said to be possible with the aid of the radial drill and honing attachment to produce a finish within 1 micro-inch in holes.

Tolerances on diameters are claimed to be held to within 0.0002 inch. This, according to company officials, has improved the quality and, as a result of making holes more uniform in size, has resulted in a cost saving for Westinghouse. The coolant for the hone is housed in a special tank which is separate from the lubricant used for conventional drilling operations and one set of stones is said to usually last for the complete job, or an average of 12 holes.

The 5A radial drill and honing attachment are products of The Carlton Machine Tool Company of Cincinnati.

For more data circle 4 on Reader Service Card

★ ★ ★

### **High-Velocity Profile Milling of Steel Aircraft Ribs**

**Profile milling** the edges of 155-inch-long steel closure ribs for large aircraft is now being performed efficiently and economically on a spindle shaper at 2,062 s.f.m. using a Kennametal K2S carbide-tipped,

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**THIS FACT,** and a "reserve of accuracy" built into the machine, work spindle and hob spindle runout of less than .0002" as an example,

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May, 1955

modern machine shop 167

## **modern equipment at work . . .**

1 $\frac{3}{4}$ -inch diameter, three-flute special end mill. Clever adaptation of this woodworking machine permits accurate machining of the modified S.A.E. 4340 (heat treated to 40-42 Rockwell C) slender workpieces to a definite profile.

These closure ribs for B52 aircraft, which are  $\frac{3}{32}$  to  $\frac{1}{2}$  inch thick, are clamped to an aluminum fixture, the edge of which has been accurately machined to the required rib contour. This edge acts as a template and rides along an Ampco bushing mounted on the cutter shank, thus permitting the desired profile to be generated on the workpiece. Two machines in line, with a roller conveyor between them, are used for this operation. The clamped workpiece is hand-fed into the first roughing machine

which takes a  $\frac{3}{32}$  to  $\frac{1}{2}$ -inch depth of cut at 4,500 r.p.m. On this machine, the shank-mounted bushing is about  $\frac{1}{8}$  inch larger in diameter than the Kennametal K2S cutter used. This leaves about  $\frac{1}{16}$  inch of stock for finishing.

The workpiece is then slid across to the finishing machine on which the Ampco bushing is the same diameter as the K2S cutter. Only two minutes are said to be required to complete each cut. Floor-to-floor time for rough and finish machining an edge is approximately 20 minutes. During the cutting cycle, two coolant streams of CO<sub>2</sub> are directed at the cut. Life per grind of the 1 $\frac{3}{4}$ -inch diameter end mill is two cuts on roughing and from five to eight cuts on finishing.

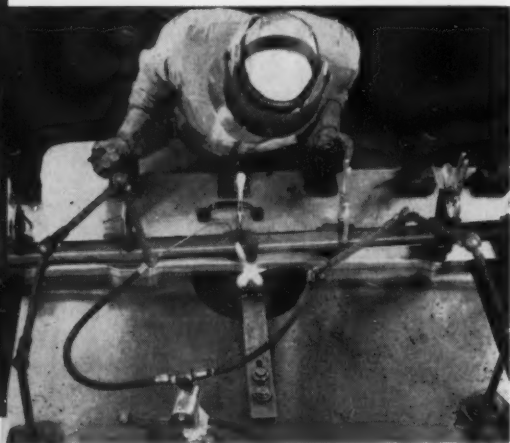
For more data circle 5 on Reader Service Card

★ ★ ★

## **Two Standard Machines Combined to Perform Special Sawing Job**

The two machines illustrated herewith are Motch & Merryweather Model 00G automatic circular sawing machines which have been combined to solve the problem of cutting from stock a piece 2 $\frac{5}{8}$  inches in length, with a right-angle (90-degree) cut on one end and a 15-degree angular cut on the opposite end.

The machine in the rear cuts a piece twice the finished length to provide the square ends. A chain-operated conveyor indexes the cut piece to the second loading station on the machine in front. The front machine is positioned at a 15-degree



Profile milling 155-inch long S.A.E. 4340 steel closure ribs for large aircraft on spindle shaper equipped with a three-flute end mill.

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HARD WAY?**

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maintenance operations are  
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or tiresome  
positions.



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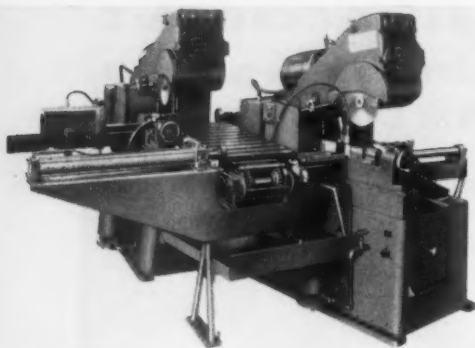
**IT'S A**

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modern equipment at work . . .



This illustration shows how two standard automatic circular sawing machines have been combined to cut from stock a piece  $2\frac{3}{8}$  inches in length, with a right-angle cut on one end and a 15-degree cut on the opposite end.

angle and is equipped with angular jaws on a double-acting self-equalizing vise, which hold the double-length piece during the cutting by a circular saw blade. By cutting the piece in half, the desired end result is a part with a 15-degree angle at one end and a 90-degree angle at the opposite end.

Stock is fed automatically to each machine. A stock stop, on each machine, actuates the vise when the stock is pushed against it. The stock stop gages the lengths to be cut on the respective machines. The sawing cycle begins as soon as the vise has clamped the stock. At 100 per cent efficiency, 89 cuts per hour are possible (in this case) on c-1118 hot rolled steel,  $1\frac{1}{2}$  by  $2\frac{5}{8}$  inches.

For more data circle 6 on Reader Service Card

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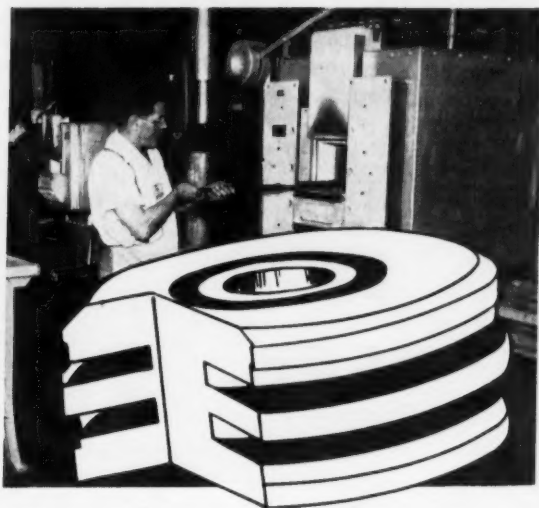


SINGLE  
POINT  
DRESSER

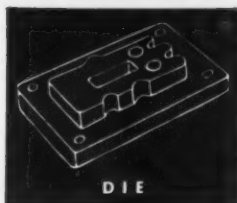


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ROTARY FILE

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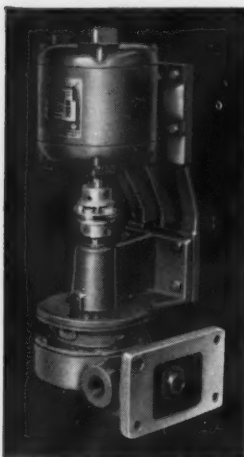
**modern equipment at work . . .**

## **Splining Hollow Transmission Shafts**

**Producing splines** on both ends of a relatively thin-walled hollow shaft, 14 inches long, presented a difficult problem for a major builder of auto-

motive transmissions who brought his problem to Michigan Tool Company of Detroit. The 28-tooth 24-pitch splines have a face width of  $\frac{7}{8}$  inch at one end and  $1\frac{1}{4}$  inches at the other. Shaping or roll forming the splines was indicated due to the adjacent bearing surfaces, which were slightly larger in diameter than the o.d. of the splines.

Since the walls of the shaft were too thin to withstand the pressures of the Roto-Flo spline rolling process, shaping remained as the most practical method of machining the splines. The Shear - Speed gear shaper method of producing all of the spline teeth simultaneously gave the desired high production rate. However, Michigan Tool advised that while the Model 1833 Shear - Speed, with a capacity for work up to 3 inches in diameter and 3 inches in face width, was the right machine for the splines, throat clearance on



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$\frac{1}{8}$  to 60 gpm—200 to 500 rpm—15 to 35 psi

Model shown above is one of a complete line of flange-mounted type pumps which provides strict conformity to J.I.C. standards.

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SKIL sander quickly removes stencil marks from crates to permit re-use.

## Cut costs and speed production on the job . . . or in the shop!

You'll be able to handle many jobs more profitably, and do *new kinds* of jobs with SKIL's 852 Sander. No matter what your product or problem, if grinding, sanding, or polishing is involved . . . SKIL is your answer. Just look at the advantages:

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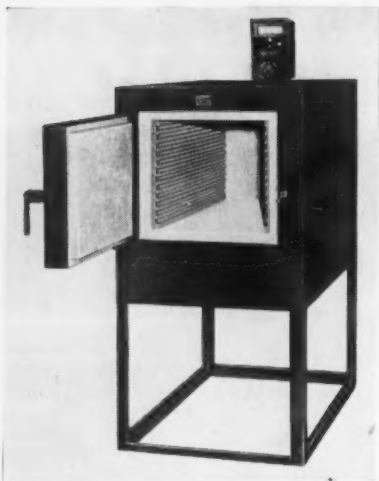
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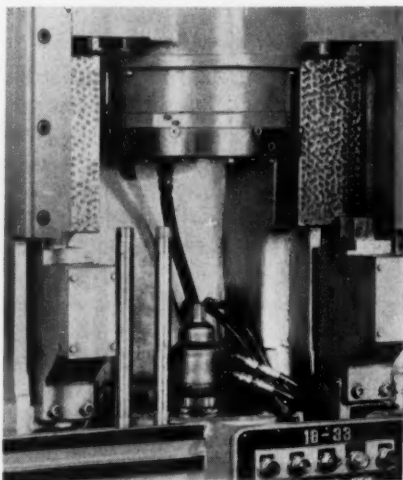
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174 modern machine shop

## modern equipment at work . . .

the machine only provided for taking work up to 10 inches in length. Since the automatic transmission shaft was 14 inches in length, an additional 4 inches of throat clearance was needed.

By increasing the height of the main column casting on the machine, mounting a longer-stroke hydraulic piston and making other slight modifications such as lengthening the shaft that drives the feed and relief mechanism, Michigan Tool produced a modified Model 1833 Shear-Speed tailored to the job. Other special fixtures include a safety lock that insures maximum



Splines are cut on both ends of a 14-inch long hollow shaft on a Michigan Tool Company Model 1833 Shear-Speed. The cutting time on the 7/8-inch face width spline is 12 seconds, and the 1 1/4-inch face width spline is cut in 15 seconds. The machine was modified to increase throat clearance to the 14-inch clearance required by this particular part.

May, 1955

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duction. Make sure, before you buy, that the lathe of your choice can take such punishment.

**ASK ONE QUESTION!**

What is the headstock gear arrangement?

**MAKE SURE OF THREE POINTS**

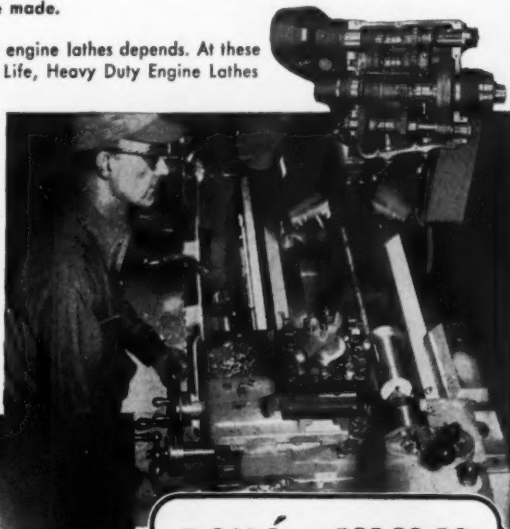
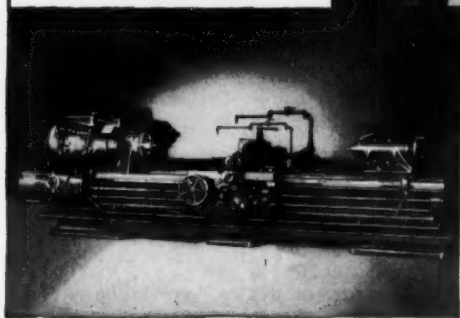
- (1) That all gears are arranged in a horizontal plane, easy of access.
- (2) That gears are in constant mesh, with speed changes effected by means of sliding jaw clutches, eliminating gear wear due to shifting action.
- (3) That the "back gear" is in front of the spindle, exerting its powerful downward thrust to offset the lifting action of the tool when heavy cuts are made.

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"Back-gear-in-front" guards spindle bearings during heavy cuts.



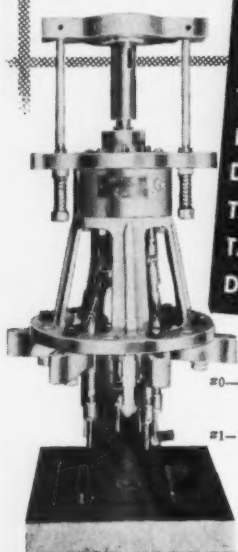
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**LESS THAN  
1/2 MINUTE  
TO CHANGE  
HEAD FROM  
DRILLING TO  
TAPPING OR  
TAPPING TO  
DRILLING**

#0—0" to 1/4" Tap Capacity  
Min. centers 11/16"  
Max. Pattern 5 1/4"

#1—7/32" to 1/2" Tap Capacity  
Min. centers 1 1/4"  
Max. Pattern 8"

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176 modern machine shop

modern equipment at work . . .

throat clearance while loading and unloading the work and a hydraulically actuated wedge-type automatic clamping fixture with safety interlock that permits machine operation only when the proper end of the hollow transmission shaft is in cutting position.

Change-over from shaping splines on one end of the shaft to the other requires about 15 minutes. It involves changing the bottom stop on the fixture for correct height, replacing change gears to give correct cutting speed, and adjusting the stroke of the reciprocating work fixture to conform with the face width of the splines being cut. No change-over on the cutting tool head is required, except as the tools are sharpened. Cutting cycle time for the 7/8-inch face width spline is 12 seconds, while the 1 1/4-inch face width splines require 15 seconds.

For more data circle 7 on Reader Service Card

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DO NOT TALK  
TO OPERATOR



"Since when do we have to have a job order to get a pot of mud warmed?"

May, 1955

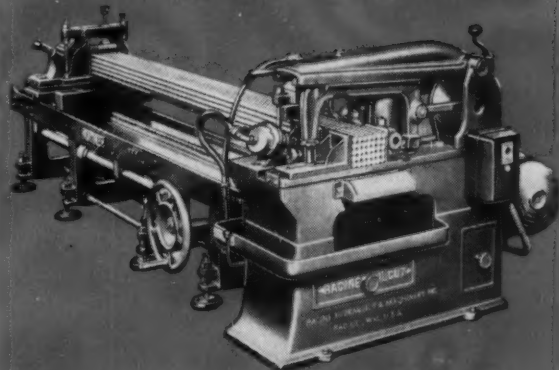


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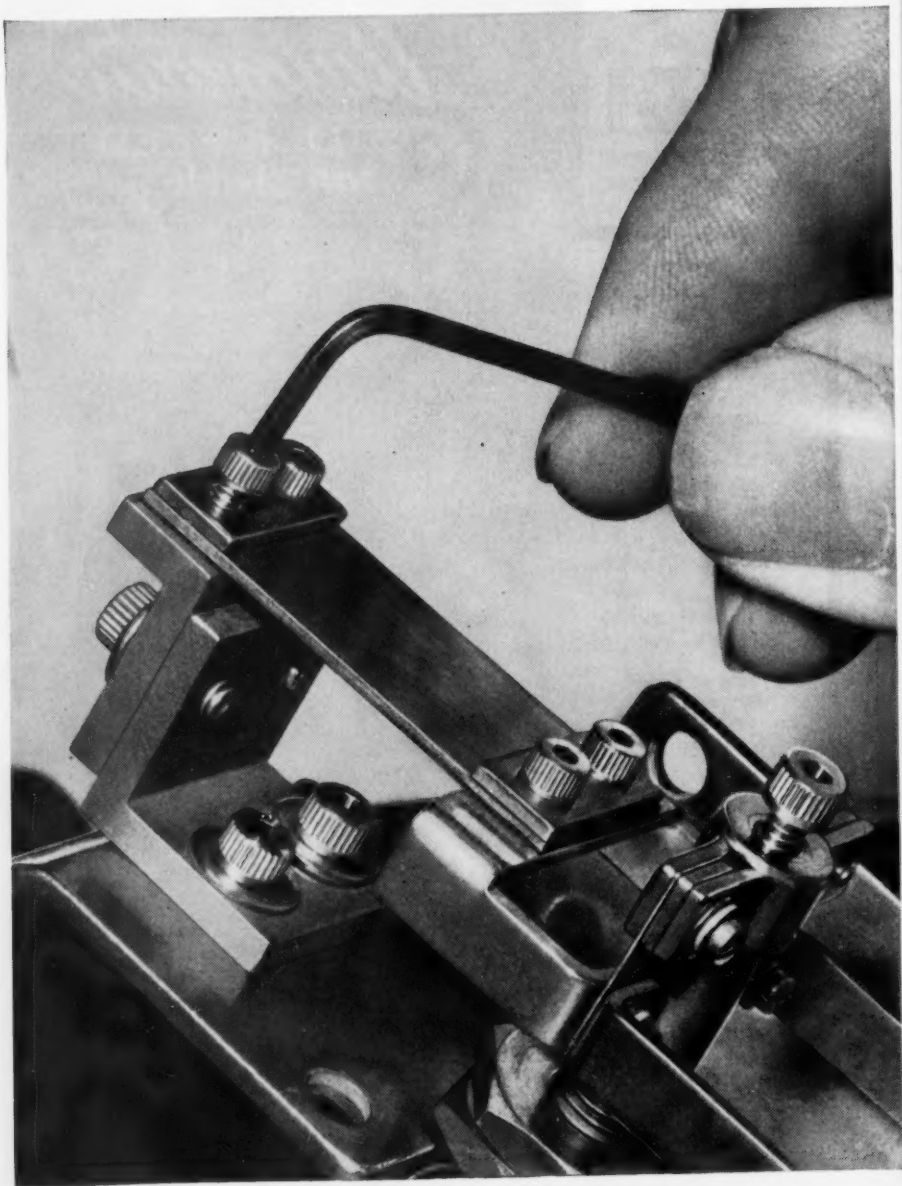


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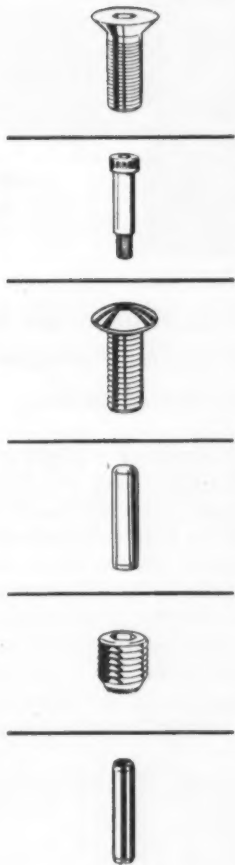
Catalog is available describing RACINE'S complete line of Metal Cutting Machines. Address **RACINE HYDRAULICS & MACHINERY, INC.** 2070 Albert St., Racine, Wisconsin.

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## UNBRAKO AT WORK



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SOCKET SCREW DIVISION



JENKINTOWN PENNSYLVANIA

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## ideas from readers

**FOUR** time-saving suggestions for the man  
in the shop

### Disabling Slide for Piercing Punches

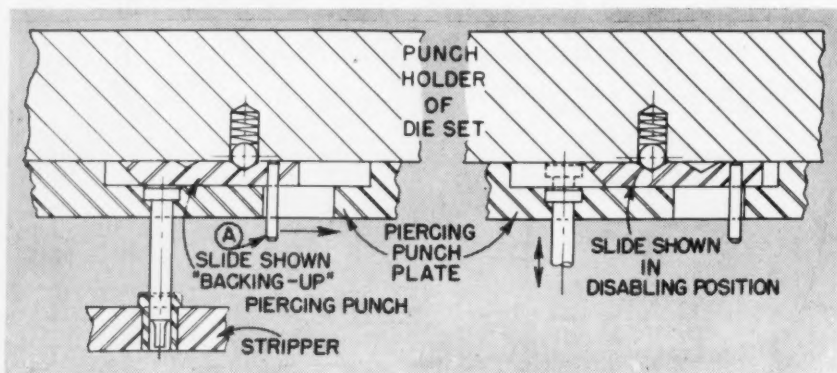
By FREDERICK BARKER

**Whenever a right** and a left-hand blanked part were pierced in the same piercing die and there were holes that were not common to each other, we found it necessary to remove or "pull" the piercing punches. Formerly, this latter job had to be done in the toolroom by a skilled toolmaker at a loss of time and at considerable expense.

After installing a disabling slide

of the design shown in the accompanying sketch, we discovered that any desired piercing punch could be disabled by an operator without removing the die from the punch press. This disabling action is accomplished by merely pulling the handle A back, thus causing the slide to move away from the head of the piercing punch.

Therefore, since the punch is not "backed up," it will not pierce a hole but will merely shuttle up and down in the space provided, as shown in the right-hand diagram of the sketch.



*Cross-sectional sketch of disabling slide for use in connection with piercing punches.*

## Coolant Ring Prolongs Tool Life

By JOHN ROGERS

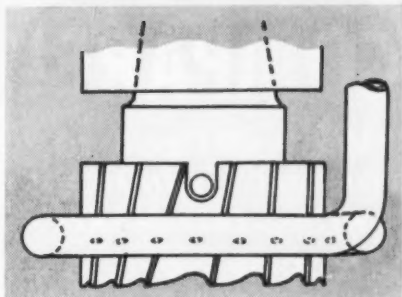
To provide ample coolant for each tooth of larger end milling cutters in order to prolong tool life, we have made coolant rings as shown herewith. A length of copper tubing is drilled for as many outlets as desired, bent into a loop, and fastened to the milling machine around the cutter so that the coolant splashes against the cutting edges. More pieces per grind was the end result that proved the soundness of this particular idea.

★ ★ ★

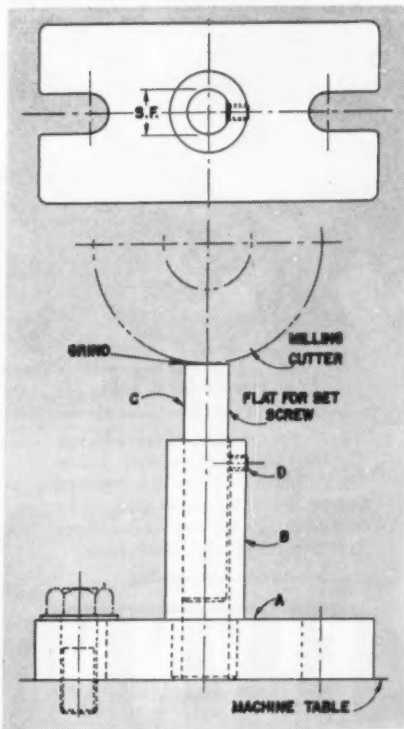
## Adjustable Set-Up Gage for Milling Cutters

By ROGER ISETTS

The accompanying sketch shows an easily-made telescoping set-up gage which can be used advantageously when setting milling cutters so that they will cut the proper depth. Easily adjustable so that it can be used for a wide variety of jobs on either horizontal or vertical milling machines, the gage includes a base, A, which consists of a flat piece of cold-rolled steel approximately 3 x 6 inches that is slotted on each end for hold-down bolts. A hole is bored in the center of the base A to provide a press fit for the upright B. A hardened and ground shaft, C, slides up and down in the upright B. This shaft has a flat on one side to accommodate a set screw, D, which serves to hold the shaft firmly in the desired position.



Sketch showing how piece of copper tubing can be adapted in such manner as to provide an effective coolant ring for the purpose of prolonging life of larger end milling cutters



Sketch of easily-made telescoping gage for setting milling cutters to cut proper depth.

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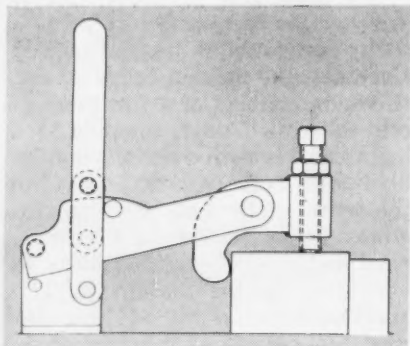
182 modern machine shop

ideas from readers . . .

## Converted Toggle Clamp Provides Two-Directional Clamping

By RALPH GORDON

In order to clamp a workpiece down as well as against a locating block of a fixture with a minimum of time loss, a standard toggle clamp can be easily converted into a two-directional clamp, as shown in the accompanying sketch. The clamping end of the toggle clamp is drilled for a hinge pin that will hold a special bell clamping unit. This bell clamp consists of a piece of flat steel, shaped as shown, drilled for the hinge pin, and welded to a length of bar stock which is drilled and tapped to receive a set screw. The set screw permits the customary adjustment for best clamping pressure and is locked with a nut. By varying, in design, the two distances



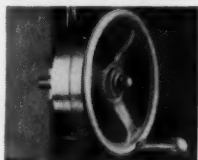
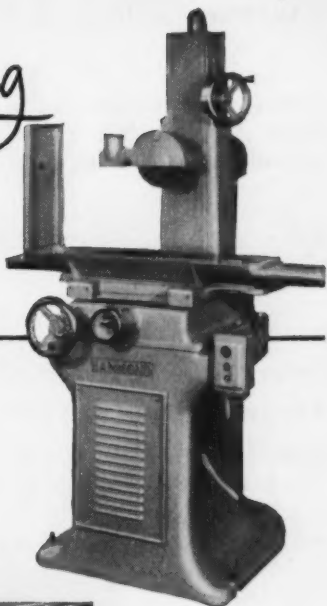
Sketch of converted toggle clamp which is designed for two-directional clamping of parts

May, 1955



# Accurate Grinding

**FOR  
SMALL  
PARTS**



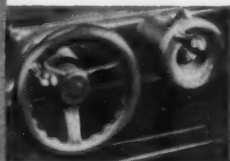
## ACCURATE SPINDLE ADJUSTMENT

Standard vertical adjustment of spindle through handwheel is .0005". With Vernier attachment, spindle can be raised accurately to .00005".



## SOLIDLY SUPPORTED SPINDLE CARRIER

Spindle carrier is moved vertically on double dovetail ways with adjustable tapered gibs.



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Handy wheels for cross travel, accurately gauged to thousandths, and quick acting longitudinal travel.



## SMOOTH ROLLER CHAIN TABLE DRIVE

Remarkably smooth finish on work without chatter marks frequently found when table is moved by conventional means through rack and pinion.

■ The Hammond No. 2, 6" x 18", Surface Grinder is a precision tool room machine for use on the most accurate gauge and tool work.

The standard spindle is direct motor driven and is mounted on precision preloaded ball bearing. Total vertical adjustment is 10 3/4". In and out movement of table is 6 1/2" with a longitudinal travel of 18".

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# FOOTBURT

## SURFACE GRINDING

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May, 1955

modern machine shop 163

### **ideas from readers . . .**

(hinge center to set screw axis and hinge center to bell clamp point), various ratios of clamping pressure can be obtained.

In many cases, a clamp of this design simplifies the operator's task of placing the workpiece tightly

against locators and of holding the workpiece in place while clamping.

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**READER SERVICE CARDS**  
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### **Interrupted Cutting of Forged Steel Tractor Part**

**Demonstrating use** of new Wesson Grade 26 cemented carbide, a single grade created primarily to handle all types of steel rough and semi-finish machining — light, medium and heavy duty — over a range of from 100 to about 400 s.f.m. Operation shown here is severe interrupted roughing cut of a tractor forged steel brake band anchor. A standard Wesson

band-type Multicut tool is being used on a 4A Warner & Swasey turret lathe. Cutting speed on this job ranges from 280 s.f.m. down to zero. The feed for this operation is 0.027 inch with a depth of cut  $\frac{1}{8}$  inch.

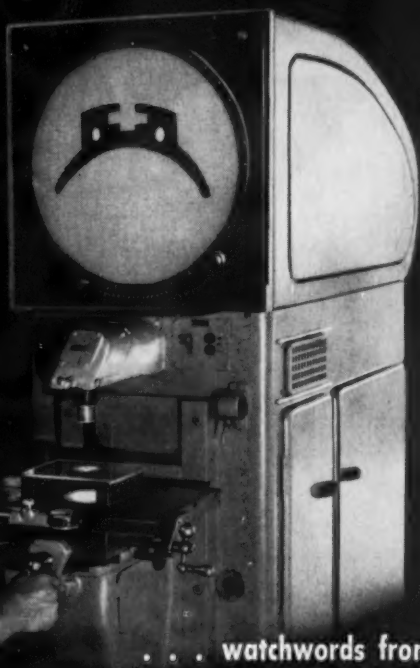
According to Wesson Company officials, a thirty per cent increase in tool life was realized on this severe interrupted cutting job through the use of the new Grade 26 cemented carbide.

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piece parts  
with tolerance  
drawings on  
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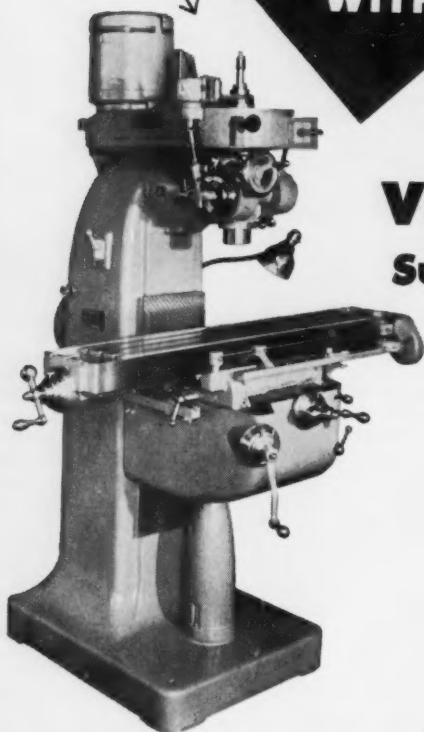
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# INDEX MACHINE CO.

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May, 1955

# BRYANT No. 21 THREAD GAGE



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## **"Better Selling" and "Tool Replacement"**

***The above topics were themes at the recent 31st Spring Meeting of The American Machine Tool Distributors' Association.***

**Two panel discussions were featured** at the 31st Spring Meeting of the American Machine Tool Distributors' Association, March 24 and 25, at the Greenbrier, White Sulphur Springs, West Va. The meeting was attended by 240 members and their guests, including builders. More than 140 distributor companies were represented.

The first panel, reflecting the "better selling" theme of the meeting, presented the views of panel members on the selection, training and introduction of the new salesman. The other panel discussion covered methods and controls in office management.

In opening the meeting, the Association president, R. A. Vidinghoff, president of Machinery Associates, Inc., Wynnewood, Pa., said that the theme of the meeting had been selected by members in a recent poll. He said: "Right now, the emphasis is on more sales. The transition from an expanded defense program, with its extraordinary demands, to a peace-time market has created many problems. We have an expanded capacity within our industry, but the present demand has not absorbed this capacity in all instances.

"A large segment of our industry de-

pends upon the machine tool distributor for the proper sale and service of machine tool equipment. The metal-working industry looks to the machine tool distributor for recommendations that will cut costs, create a better product . . . and at the same time give us increased capacity for defense."

### **Warns Against Playing Politics with Business**

A note of warning against "current tendencies to play politics with the nation's business and economic interests" was sounded by Thomas R. Rudel, president of the Rudel Machinery Company, New York City, and past president of the Association, in his report as chairman of the Government Relations Committee. He said: "Events in Washington have made this a period requiring considerable vigilance. Almost continuously there have been efforts to promote and pass legislation of strong political flavor aimed at industry. Acting from what they assume to be political pressure, a number of legislators have been guided not by the welfare of business but by the welfare of politics. If successful, these efforts could only result in discouraging busi-



ness, at the expense of the country."

Two such instances, he said, concern efforts to weaken gains made by business in accelerated depreciation and advance reserves for future expenses.

### Replacement Potential Stressed

Industry's need to replace its obsolete and worn out machine tool equipment was stressed at the meeting by principal speakers representing the industry. Mr. Vidinghoff said that of about two million machine tools installed in the metalworking industry, more than four hundred thousand of these are 20 years old and that over a million are 10 years old. He pointed out that the government's liberalized policies toward depreciation provides a "real incentive" to machine tool users to modernize. He said that the replacement market is the reason that the machine tool industry can be kept working at capacity for a long time to come.

Milburn A. Hollengreen, president of the National Machine Tool Builders' Association and of the Landis Tool Company, Waynesboro, Pa., also stressed the obsolescence of the major portion of the metalworking equipment of the United States in his address, "Spending for Profit." He said: "Those of us in the industry must realize that we shall lose our industrial pre-eminence if we continue on and on 'wearing it out and doing without.' Nobody today in the metalworking industry can stand the cost of not having modern, efficient machines."

Mr. Hollengreen said that tool improvements mean little to financial officers of companies unless they can be translated into financial savings. He cited the following advantages of modern machine tools in terms of financial interest:

- (1) reduced direct labor costs, or conversely, increasing output per man hour.
- (2) reduced overhead.



Thomas R. Rudel R. A. Vidinghoff

- (3) improvement of product to gain competitive advantage or in new products to gain diversification.

Mr. Hollengreen praised the work of the distributors' association, which has worked "over the years in the interest of better machine tools and the more effective utilization and distribution of machine tools."

Tel Berna, general manager of the National Machine Tool Builders' Association, told the meeting that it is difficult, at the present time, to predict the immediate future for the industry. He said that following recent advances in sales, the industry has maintained a plateau in volume. During the coming year, he said, he felt that the chief area for progress is to be found in the replacement market.

He said: "No matter how we approach the problem, we keep coming back to the individual salesman, whose job it is to show the man running the shop the profits he is losing because of old equipment." He also said that it is on salesmen as individuals, that depends the success of the United States. "We face the type of war," he said, "that could come overnight. To meet such a war, we must have strong machine facilities."

### Panel on "The New Salesman"

Members of the panel on "The New Salesman" were: Charles B. Tansley, executive vice president of Bryant Ma-

## "Better Selling" . . .

chinery & Engineering Company, Chicago, Ill.; F. Lee H. Wendell, A. T. Kearney & Company, Chicago, Ill.; and William F. Reiff, Jr., Garco Machinery, Inc., Cleveland, Ohio.

Mr. Tansley outlined the various qualifications of the new machine tool sales engineer but said that it is difficult to set down hard and fast rules of thumb unless these points are consid-

ered as overlapping and inter-related. "It is agreed that age, personality, appearance, level of knowledge, mental capacity, physical condition and integrity are the general points to investigate," he said.

Mr. Wendell urged that the application form be used by companies hiring new salesmen, as it can be extremely helpful in assuring that comparable data is obtained on all applicants. He also said that the "planned interview" is a basic element in correct selection.

He said: "An employment interview should be a two-way proposition. The applicant wants to find out about the company and the type of people who run it. You want to find out how well this applicant will fit in and contribute to the company's growth." In addition to obtaining references, Mr. Wendell said that it is often helpful in formulating a decision regarding a prospective new

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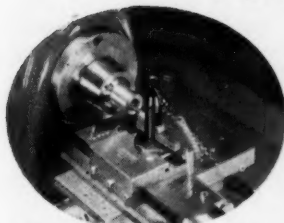


M. A. Hollengreen



## HIGH SPEED PRECISION LATHE

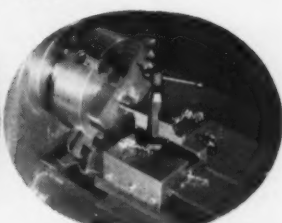
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"PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE"

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May, 1955

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## "Better Selling" and "Tool Replacement" . . .

salesman to prepare a written evaluation of him.

Mr. Reiff outlined the following four steps in the training of a machine tool salesman: (1) inside indoctrination, (2) product education, (3) customer contact, and (4) follow up training. "Inside indoctrination," he said, "consists of making the new employee familiar with all office procedure, office machinery and paper work. Product education should start with reading and progress to visits to the factory. First calls on customers can be made to those who have just received or installed the simple or standard type of equipment." Mr. Reiff also said that it is essential not to forget the new salesman once he is employed, but to continue his training, as for example, at sales meetings.

### Panel on "Office Management"

Members of the panel on "Office Management" were C. Denson Day, vice president of Machinery Associates, Inc., Wynnewood, Pa.; J. Russell Clark, president of White Star Machinery Company, Wichita, Kansas and John C. Harkness, A. T. Kearney & Company, Chicago, Illinois.

Subjects covered by Mr. Day included control of inquiries, order follow-up, orders and expense accounts. In

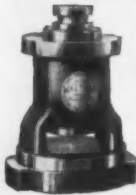
each case, Mr. Day enumerated several factors involved in adequate control, covering such considerations as the various records and procedures required. "Order follow-up," he said, requires "meticulous care by experienced personnel to be sure Mr. Customer gets just what he bought and gets it when he was told he would."

He said: "The order must be checked in every detail; against the quotation to watch for mistakes, sleeper clauses in fine print and plain misunderstandings. Prompt accurate and concise three-way exchange of communication, whether by phone, wire or letter, with the customer, with the salesman and with the manufacturer is fundamental."

Mr. Clark said that he advocated objectives in sales control being stated in sales quotas. These, he said, should be in combination with (1) cost of selling and (2) number of calls.

He said: "Achieving adequate control over sales operations requires a system of records and reports that will indicate differences between planned or expected performance and actual performance. In a proper sense, control is more than the reports themselves; it is the action that must be taken to bring performance into line with plans." Sales reports, he said, can be

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TA-5005(M)

## "Better Selling" and "Tool Replacement" . . .

involved or relatively simple. "However," he said, "first and foremost, sales reports must be made daily to do the job."

Mr. Harkness pointed out the necessity for analyzing all data provided by salesmen in terms of expenses incurred. Taking the activities of a typical salesman as an example, he analyzed the costs involved in calling on companies where sales were made as contrasted to costs in calling on companies where no sales were made. An analysis of calls on companies where no sales were made showed an excessive number of calls and expense compared with the company's potential.

Mr. Harkness was critical of the concept that salesmen are in business for themselves and said that "too often the need of a salesman for immediate income from sales tends to make him overlook the need for patient building for the future among companies with large but longer-range sales potential." He said: "I believe this difference in concepts is one of the fundamental reasons that we have trouble in getting salesmen to send in reports, why time is wasted, and why more and better promotional calls are not made."

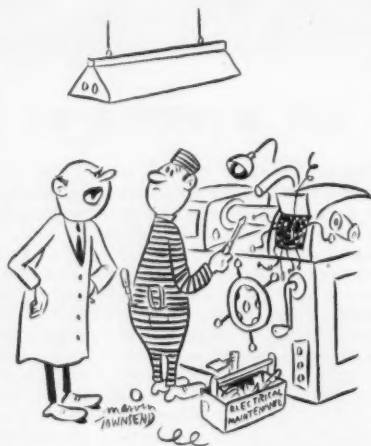
**Repeated references** were made by speakers at the meeting to the forthcoming, Machine Tool Show, to be held in Chicago, at the International Amphitheatre, September 6th to 17th, 1955, with a Production Engineering Show of accessory equipment at Navy Pier on the same days.

In a report on the activities of the Association's Machine Tool Show Committee, chairman Frank H. Habicht, vice president and general manager of Marshall & Huschart Machinery Company, Chicago, Ill., predicted a "tremendous interest" and atten-

dance. He said: "When we consider that wages have gone up much faster than machine tool prices, it is evident that the modern machine tool is a greater bargain than ever. Our industry is in position to make good deliveries. Metalworking plants face a period of intense competition, and they have an enormous accumulation of machine tools that could be replaced at a profit."

Principal speakers at the meeting included James C. Kelley, the general manager of the Association; Jennings Randolph, assistant to the president of Capital Airlines, Washington, D. C., who addressed the banquet meeting on the subject, "Good Selling Builds a Better America," and Millard C. Faught, of the Faught Company, management consultants, New York City.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

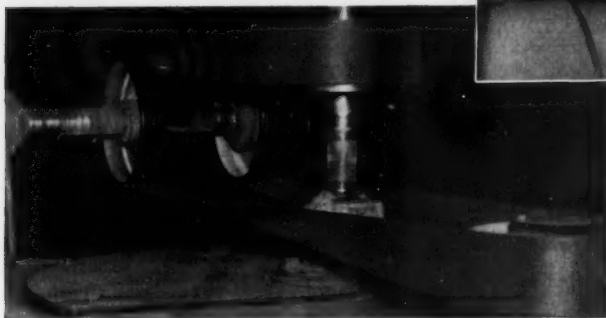


"All right, Sweeney! Let's not make such a big deal out'a you not having any days off for the last six weeks."



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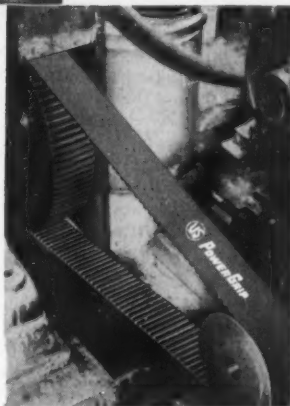
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May, 1955

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## new literature

*Use the Reader Service Cards opposite the covers for requesting free copies of the literature listed below.*

### **9. Dust Collector**

Illustrated bulletin covering the "Dust-snaire" Dust Collector. Abrasive Machine Tool Co., 20 Dunnellen Rd., East Providence 14, Rhode Island.

### **10. Cemented Carbides**

Carbet Division, Allegheny Ludlum Steel Corp., Dept. MS, Pittsburgh 22, Pa. Catalog (No. C-11) describing CA-608 and CA-610 steel cutting grades of cemented carbides.

### **11. Drill and Lathe Chucks**

Illustrated 6-page bulletin (No. C-255) discussing its drill chucks and lathe chucks. T. R. Almond Mfg. Co., 4610 Beidler Rd., Willoughby, Ohio.

### **12. Broaching Equipment**

American Broach & Machine Co., Ann Arbor, Mich. Revised 32-page catalog (No. 450) covering its line of broaches and broaching machines and fixtures.

### **13. Tubing Steels**

Technical data sheet (No. 177) on the analyses of standard carbon, alloy and stainless tubing steels for elevated temperature and/or pressure service. The Babcock & Wilcox Co., Tubular Products Division, Beaver Falls, Pennsylvania.

### **14. Honing Machine**

Barnes Drill Co., 860 Chestnut St., Rockford, Ill. 12-page bulletin (No. 600) covering the "Barnesdril" 223 High Production Honing Machine.

### **15. Tapping Attachment**

Illustrated 6-page folder describing its lead screw tapping attachment. Boyar-Schultz Corp., 2020 S. 25th Ave., Dept. F-L, Broadview, Illinois.

### **16. Air Operated Tools**

W. R. Brown Corp., 2649 N. Normandy Ave., Chicago 35, Ill. 4-page brochure discussing the "Speedy" line of air operated production tools, including an air vise, air press and air ram.

### **17. Gears**

Chicago Gear Works, 440-50 N. Oakley Blvd., Chicago 12, Ill. Catalog (No. 20) covering gears, speed reducers, sprockets, thrust bearings, flexible couplings and pulleys.

### **18. Radial Drilling Machine**

Illustrated brochure describing its 3-foot 7½-inch radial drill with a flame-hardened column. Cincinnati Lathe & Tool Co., 3265 Disney St., Cincinnati 9, Ohio.

### **19. Deep Drawing Machine**

The Cincinnati Milling Machine Co., Cincinnati 9, Ohio. 24-page publication (No. M-1759-3) discussing the "Hydroform," a deep drawing machine for simple and intricate shapes.

### **20. Automatic Screw Machine**

Illustrated catalog covering the 2½-inch Model AW Single-Spindle Automatic. The Cleveland Automatic Machine Co., Cincinnati 12, Ohio.

## **21. Vises**

The Columbian Vise & Mfg. Co., Cleveland 4, Ohio. Descriptive catalog (No. 55) covering its complete vise line.

## **22. Slide Feeds**

Cooper Weymouth, Inc., 277 Noble Ave., Bridgeport 8, Conn. Catalog on slide feeds for punch presses.

## **23. Chucking, Indexing Fixtures**

Illustrated 8-page bulletin on chucking and indexing fixtures for use on milling machines and drill presses. J. W. Dearborn, Ansonia, Connecticut.

## **24. Metalcutting Lathe**

Delta Power Tool Division, Rockwell Mfg. Co., 606-D N. Lexington Ave., Pittsburgh 8, Pa. 8-page folder describing its 11-inch metalcutting lathe.

## **25. Parts Handling Equipment**

Catalog (No. DN-1000) discussing NesTier nesting-stacking boxes and baskets, Rollover hoppers, hopper rack assemblies and shelf racks. Chas. Wm. Doepke Mfg. Co., Inc., 8879 Blue Ash Rd., Rossmyrne, Ohio.

## **26. Drilling Machine**

Edlund Machinery Co., Cortland 26, N. Y. 4-page bulletin (No. 160) covering the Model 1F Sensitive Drilling Machine.

## **27. Taper Attachment**

Illustrated catalog sheet describing the "Taper-Tail" Taper Attachment for lathe tailstocks. The L. A. Fitzer Tool Works, 329 E. Park Blvd., Villa Park, Illinois.

## **28. Gage Blocks**

Fonda Gage Corp., Dept. M-30, Stamford, Conn. 28-page catalog on "Ultra-Finish" rectangular and hoke-type gage blocks, in steel and tungsten carbide.

## **29. Steel Shelving**

Brochure (No. 701) describing Klip-Bilt, a boltless shelving erected without the use of tools. The Frick-Gallagher Mfg. Co., Wellston, Ohio.

## **30. Low Pressure Cylinders**

Galland-Henning Mfg. Co., Nopak Division, 2578 S. 31st St., Milwaukee 46, Wis. Catalog (No. 101) devoted to low pressure cylinders.

## **31. Teflon Rods**

The Garlock Packing Co., Palmyra, N. Y. Illustrated 4-page folder discussing the physical properties of the two grades of Teflon available in rod form.

## **32. Universal Joints**

Illustrated 12-page catalog (No. 2) describing Rzeppa Constant Velocity Universal Joints. The Gear Grinding Machine Co., 3901 Christopher, Detroit 11, Michigan.

## **33. Renting Machine Tools**

Gisholt Machine Co., Madison 10, Wis. Brochure providing information which should be known about buying and renting machine tools.

## **34. Feed Finger**

Green Mfg. Co., 122 S. Prairie Ave., Rockton, Ill. Literature describing the adjustable-grip Master Feed Finger.

## **35. Cut-Off Machine**

Illustrated bulletin (No. 101) covering the Model CO-18 Cut-Off Machine. Grob, Inc., Grafton, Wisconsin.

## **36. Push-Button Lathe**

Hardinge Brothers, Inc., Elmira, N. Y. 24-page bulletin (No. HLV) describing the push-button infinite speed control and independent variable electric feed for carriage and cross slide for the Model HLV lathe.

## **37. Adjustable Clamps**

Illustrated 4-page brochure on rapid adjustable toolroom clamps. Hi-Lo Tool Products Co., Inc., 18525 Weaver Ave., Detroit 28, Michigan.

## **38. Hydraulic Press**

Specifications manual on a combination hydraulic forcing and straightening press. Stanley H. Holmes Co., 3300 W. Lake St., Chicago 24, Illinois.

### **39. Lathe Chucks**

Horton Chuck Division of The E. Horton & Son Co., Windsor Locks, Conn. Catalog and net price selector of Tru-Set and Windsor lines of chucks.

### **40. Oil Filters**

Illustrated 8-page bulletin (No. 101) describing Honan-Crane "Full Flow" Oil Filters. Houdaille-Hershey of Indiana, Inc., Filtration Division, Lebanon, Indiana.

### **41. Metal Disintegrator**

Jiffy Tool Supply Co., Inc., 109 E. Nine Mile Rd., Ferndale 20, Mich. Catalog sheet (No. A-1) on a unit which disintegrates hard metals.

### **42. Indicating Gage**

Illustrated bulletin describing the CEJ Mikrokator, a precision instrument for dimensional measurements. C. E. Johansson Gage Co., 10641 Haggerty, Dearborn 1, Michigan.

### **43. Water Soluble Coolant**

Booklet entitled "How to Stop Foul Coolant Odors." S. C. Johnson & Son, Inc., Industrial Products Division, Dept. MMX, Racine, Wisconsin.

### **44. Precision Machine Vise**

Kearsarge Tool & Mfg. Co., RD3, Erie, Pa. 4-page folder describing the "Squar-Vise," a precision machine vise.

### **45. Metalworking Machinery**

Kling Bros. Engineering Works, 1320 N. Kostner Ave., Chicago 51, Ill. Bulletin (No. 100) on friction saws; combination shear, punch and coper; punches; bending rolls; and shears.

### **46. Presses and Die Casters**

Condensed general bulletin (No. 1.1) covering hydraulic presses and die casting machines. Lake Erie Engineering Corp., Box 68, Kenmore Station, Buffalo 17, New York.

### **47. Work Holders**

Lassy Tool Co., Plainville, Conn. Descriptive circular on multi-purpose work holders and holding devices.

### **48. Hydraulic Power Units**

Illustrated 8-page brochure describing "Twin Ram Master" Hydraulic Power Units. LeMaire Tool and Mfg. Co., 2657 S. Telegraph Rd., Dearborn, Michigan.

### **49. Pneumatic Bar Feed**

Lipe-Rollway Corp., Bar Feed Division, Syracuse 1, N. Y. 24-page booklet showing the operation of the A.M. L. Pneumatic Bar Feed.

### **50. 14-Inch Lathe**

Illustrated 4-page folder covering the No. 6560 14-Inch Lathe with variable speed drive. Logan Engineering Co., Lawrence and Lamon Ave., Chicago 30, Illinois.

### **51. Face Milling Cutters**

Lovejoy Tool Co., Inc., Springfield, Vt. 44-page catalog (No. 31) provides descriptions of Types A, H, J, L and C Face Milling Cutters.

### **52. Dye Penetrant Inspection**

Illustrated 4-page folder on "Spot-check," an improved dye penetrant inspection in pressurized cans. Magnaflux Corp., 7300 W. Lawrence Ave., Chicago 31, Illinois.

### **53. Plate Grinding Service**

Marshall Steel Co., P.O. Box 108, La Grange, Ill. 4-page circular covering Marshall-LCrat Low Carbon Plate Grinding Service.

### **54. Chip Conveyor**

Bulletin (No. MF-640) describing the "Chip-Tote" Conveyor which provides continuous automatic scrap removal. May-Fran Engineering, Inc., 1710 Clarkstone Rd., Cleveland 12, Ohio.

### **55. Wall-Size Wire Chart**

A unique split-gauge wall-size wire chart designed to serve as a handy reference for split-gauges in decimal sizes. Mettler Machine Tool, Inc., 157 Adeline St., New Haven, Connecticut.

### **56. Hydraulic Standards**

Miller Fluid Power Co., 2040 N. Hawthorne Ave., Melrose Park, Ill. Revised up-to-date issue of the J.I.C. Hydraulic Standards for industrial equipment.

### **57. Forged Tools**

Nelco Tool Co., Inc., Modern Tools Division, Berlin, Conn. 4-page folder on forged high speed steel tools.

### **58. Gear Checker**

Illustrated 12-page catalog describing its gear checker which is simple, fast and accurate. Orlandi Gear & Machine Co., 16195 Meyers Rd., Detroit 35, Michigan.

### **59. Spur Gear Cutters**

Potter & Johnston Co., Pawtucket, R. I. 8-page bulletin (No. 157) covering the Newark Automatic Spur Gear Cutting Machine.

### **60. Precision Toolroom Vise**

Illustrated bulletin (No. TE2-103) descriptive of a precision toolroom vise for use on jig borers, surface grinders, drill presses and tappers. The Producto Machine Co., 910 Housatonic Ave., Bridgeport 1, Connecticut.

### **61. Centers**

Ready Tool Co., 540 Iranistan Ave., Bridgeport 5, Conn. Packet of data covering anti-friction and solid centers.

### **62. Power Press**

Catalog sheet describing the "Press-Rite" No. 45 Power Press with a 45-ton capacity. Sales Service Machine Tool Co., 2355 University Ave., St. Paul 14, Minnesota.

### **63. Punch Presses**

Service Machine Co., 2310 W. 78th St., Chicago 20, Ill. 4-page condensed catalog describing Rousselle Punch Presses.

### **64. Trimming Equipment**

Illustrated 12-page catalog describing the Brehm Trimming Die and the Brehm Trimming Press. The Steel Products Engineering Co., 1205 W. Columbia St., Springfield, Ohio.

### **65. Remote Control Systems**

Design manual (No. 553) discussing valve remote control systems using flexible shafting, valve operating gear and geared joints. Stow Mfg. Co., 1 Shear St., Binghamton, New York.

### **66. Hydraulic Surface Grinder**

The Thompson Grinder Co., Springfield, Ohio. Illustrated catalog (No. CX54) describing the Type CX Hydraulic Surface Grinder.

### **67. Tube End-Forming Machines**

Illustrated 16-page catalog (No. G3) on tube end-forming machines. The Vaill Engineering Co., 17 Brown St., Waterbury 20, Connecticut.

### **68. Automatic Nut Formers**

The Waterbury Farrel Foundry & Machine Co., Waterbury, Conn. 8-page circular (No. 930-A-2) describing a line of automatic nut formers.

### **69. Clamp Assemblies**

Catalog of Wespo clamp assemblies and fixture details. West Point Mfg. Co., 26935 W. Seven Mile Rd., Detroit 19, Michigan.

### **70. Angle Bending Rolls**

Williams-White & Co., Moline, Ill. 4-page bulletin (Form 204) describing angle bend rolls for cold bending.

### **71. Machinists' Bench Vises**

Catalog sheet (No. 662) covers the redesigning of Wilton's machinists' bench vises. Wilton Tool Mfg. Co., Inc., 925-941 Wrightwood Ave., Chicago 14, Ill.

### **72. Floating Toolholder**

W. M. Ziegler Tool Co., 13566 Auburn Ave., Detroit 23, Mich. 4-page brochure on Roller-Drive Floating Toolholder.



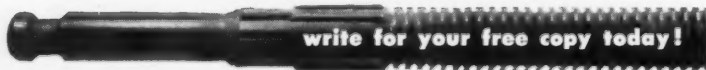
**useful  
data  
for you**



*American's* revised catalog 450  
of Broaches, Broaching Machines  
and Broaching applications

#### TABLE OF CONTENTS

- Typical broaching applications
- Broach design data
- Typical broach sections
- Broach maintenance
- Broach pull head types
- Basic machine types
- Standard keyway broach chart



**write for your free copy today!**



**American** BROACH & MACHINE CO.  
A DIVISION OF SUNDSTRAND MACHINE TOOL CO.

**ANN ARBOR, MICHIGAN**

See *American* First — for the Best in Broaching Tools, Broaching Machines, Special Machinery

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200 modern machine shop

May, 1955



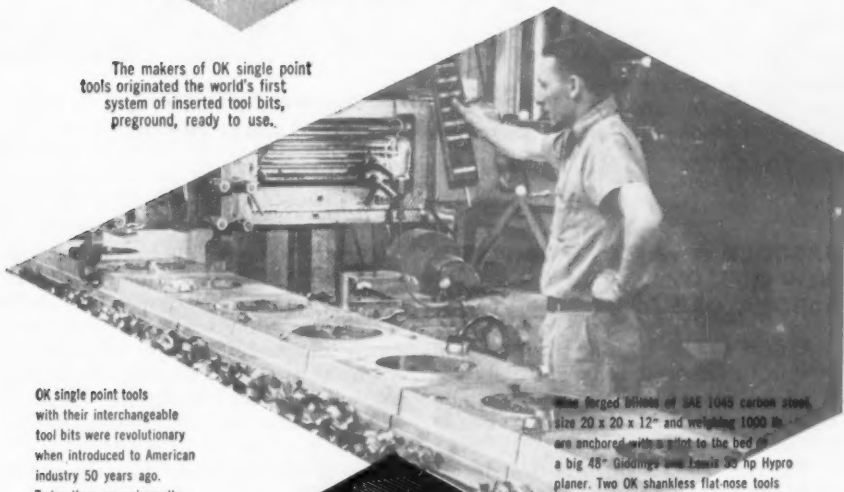
How Bullard  
with two

Man-au-trol turret heads are gang-planed

**OK**

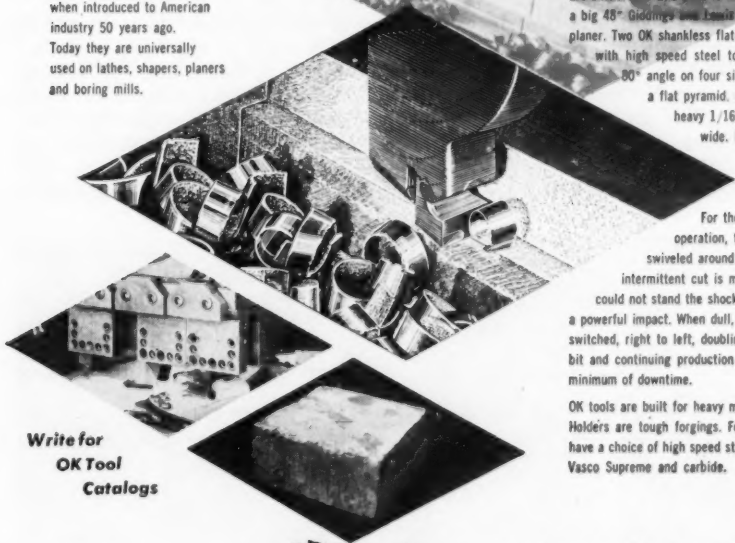
## single point tools

The makers of OK single point tools originated the world's first system of inserted tool bits, preground, ready to use.



OK single point tools with their interchangeable tool bits were revolutionary when introduced to American industry 50 years ago. Today they are universally used on lathes, shapers, planers and boring mills.

These forged blocks of SAE 1045 carbon steel, size 20 x 20 x 12" and weighing 1000 lb., are anchored with a pin to the bed of a big 48" Giddings and Lewis 50 hp Hypo planer. Two OK shankless flat-nose tools with high speed steel tool bits cut an 80° angle on four sides, making a flat pyramid. Chips are heavy 1/16" depth, 3/4" wide. Feed, 40 ft/m.



For the second operation, the blocks are swiveled around and a rugged intermittent cut is made. Carbide could not stand the shock of such a powerful impact. When dull, tool bits are switched, right to left, doubling to life of the bit and continuing production with the minimum of downtime.

OK tools are built for heavy machining. Holders are tough forgings. For tool bits, you have a choice of high speed steel, cobalt, Vasco Supreme and carbide.

Write for  
**OK Tool  
Catalogs**

TWO COMPONENTS—  
BODY AND  
BLADES



**OK**

**modern milling cutters  
for modern milling machines**

THE OK TOOL CO., INC., Milford, New Hampshire

For more data circle 405 on Reader Service Card

May, 1955

modern machine shop 201

## news of the industry

*New plants . . . management courses . . .  
plant purchases . . . personnel changes  
. . . new appointments . . .*

### **BABCOCK & WILCOX COMPLETES NEW QUALITY CONTROL LABORATORY**

A new quality control laboratory is now in full operation at The Babcock & Wilcox Company's Tubular Products Division plant in Beaver Falls, Pennsylvania.

The laboratory, which is two stories high and comprising 29,000 square feet of floor space, houses equipment of all kinds for inspection and testing procedures. Included are two production control quantumeters for determining the composition of steels by spectrographic methods. Also pointed out as

particularly interesting to the visitor is the X-ray diffraction units used with a geiger counter spectrometer to study crystal structure and with a fluorescence analyzer for rapid quantitative chemical analysis of selected alloying elements. Supplementing these is vacuum fusion equipment used to determine gas content of steel.

One of the important instruments in the area devoted to research is a dilatometer used to determine the critical transformation temperatures of steels which govern their heat-treating characteristics. Thermal expansion rates of steel can also be determined on this equipment. Hot twist-testing apparatus



*New quality control laboratory at The Babcock & Wilcox Company's Tubular Products Division*

is available for use in determining the temperature range of hot workability of alloy steels.

★ ★ ★

### **SIXTEENTH MANAGEMENT COURSE**

The College of Engineering, State University of Iowa, has announced that the sixteenth Management Course is scheduled to be held June 13 through June 25, 1955, in Iowa City. Since its inception, over 1,000 representatives of American and foreign business, industrial and governmental organizations have increased their understanding of the design and application of the major management techniques. A series of talks by recognized authorities on new developments, applications and problems in management techniques has been added to the intensive course of instruction. The entire program is designed for those who have need to use these techniques — factory managers, foremen, industrial engineers, methods and time-study analysts, cost men, office executives and others in related work.

The areas of production planning,

job valuation, motion and time study, wage incentives, plant layout, materials handling, quality control, supervisory training, labor relations and legislation, organization and policy and public speaking are included. The regular State University of Iowa teaching staff will be augmented by outstanding men from a variety of industries and other educational institutions. Communications concerning the course should be sent to J. Wayne Deegan, 118 Engineering Bldg., State University of Iowa, Iowa City, Iowa.

★ ★ ★

### **MASTER SPLINE PURCHASES MACHINERY AND SPECIAL EQUIPMENT OF AMCO GAGE**

Claude F. Brogden, president of Master Spline Co., Detroit, Mich., has announced the purchase of the complete machinery and special equipment inventory of Amco Gage Company. Master Spline has also moved into the Amco Gage building which is located at 19760 W. Eight Mile Road in Detroit. The new building, to be used as manufacturing and designing headquarters, has 20,000 square feet of



*New manufacturing and designing plant of Master Spline Tool & Gage Co. in Detroit, Mich.*

## news of the industry . . .

floor space and is located on a plot comprising approximately 65,000 square feet.

Mr. Brogden founded Master Spline five years ago to design and manufacture fine gages. To better identify the wide coverage of the company's manufacturing and designing facilities,

the company's name has been changed to Master Spline Tool & Gauge Company.

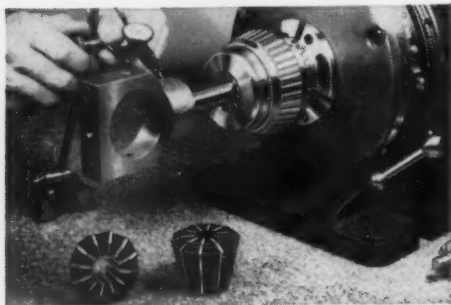
★ ★ ★

### F. J. O'LAUGHLIN ELECTED PRESIDENT OF COMMANDER MANUFACTURING

Frank J. O'Laughlin has been recently elected president of Commander

Mfg. Co., Chicago, Ill., manufacturer of production drilling and tapping equipment. Formerly director of sales and distributor relations, Mr. O'Laughlin was a member of the company's Management Committee before his election to the presidency. J. B. Chamberlain, former head of Commander, will be less active in the management of the firm, but will continue his interest as chairman of the board of di-

## HERE'S A TYPICAL HOLDING JOB



## HOW MANY MORE DO YOU HAVE?

Here the new Jacobs Model 96 Rubber-Flex Collet Chuck holds a machined part for inspection.

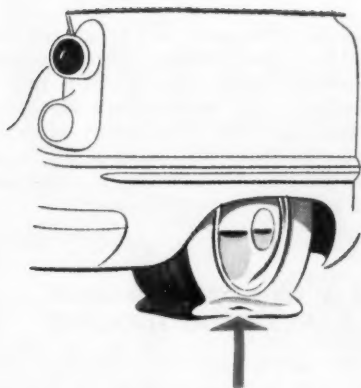
We don't yet know all the applications for this marvelous holding device. We *do* know it is the most accurate collet chuck in the world . . . that it holds any piece from  $\frac{1}{16}$ " to  $1\frac{3}{8}$ " in diameter using only 11 collets, and has a gripping power unmatched by any split steel collets.

What are your work holding jobs for Model 96? Get the details on this great chuck from your industrial distributor, or write The Jacobs Manufacturing Co., 2105 Jacobs Road, West Hartford 10, Conn. Ask for Bulletin 54-CC.

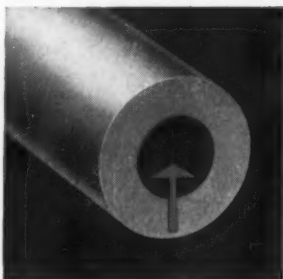


F. J. O'Laughlin

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a hole here is a letdown...



a hole here is a lift

**Crucible Hollow Tool Steel Bars** can step up output on most any production line where ring shaped or hollow parts are made. Why? Simply because the hole is already there. There's no need for drilling, boring, or hole-sawing. And that's where you save production time, increase machine capacity, and avoid scrap losses!

Crucible's famous tool steel grades are available to you in hollow form, in almost any combination of OD, ID and length. In fact, your local Crucible warehouse can give you immediate delivery of these popular grades — KETOS oil-hardening, SANDERSON water-hardening, AIRDI 150 air-hardening, and NU DIE V hot-work tool steels.

Ask your local Crucible representative how you can save time and money by using Crucible Hollow Tool Steel Bars. Call him today, at our nearby Branch Office. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 22, Pa.*

**CRUCIBLE**

first name in special purpose steels

**Crucible Steel Company of America**

For more data circle 407 on Reader Service Card

May, 1955

modern machine shop 205

## CUT DRILLING COSTS

### *Precision* HSS and CARBON TWIST DRILLS

Midget Twist Drills from  
.0059 dia. to  $\frac{3}{8}$ " dia.  
straight shank

#### STEP-UP DRILLING PRODUCTION LICK TOUGH DRILLING PROBLEMS THESE 4 PRECISION WAYS

1. **MORE HOLES AT LESS COST** — Correctly hardened and deep-freeze treated for longer life, Precision drills give consistent, dependable performance.
2. **MORE HOLES PER GRIND** — Precision drills are made of tough, durable heat-treated steel to exacting specifications that guarantee longer drill life!
3. **MORE ACCURATE HOLES** — perfectly-pointed Precision drills are ground from solid hardened blanks on Precision-self-designed, hand-built machines which combine *point grinding and fluting* . . . **GUARANTEE** utmost accuracy . . . longer!
4. **ECONOMICAL** — Precision drills cost less . . . save you money . . . up to 15%!

**PROVE IT TO YOURSELF with Precision's  
NO-RISK UNCONDITIONAL GUARANTEE . . .**

**WRITE TODAY for FREE catalog!**  
*Precision* Twist Drill &  
Machine Company

Dept. MMS-5, Woodstock St. — Crystal Lake, Ill.

Representatives — Distributors — Some Choice  
Territories Still Available

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206 modern machine shop

news of the industry . . .

rectors. Prominent in the activities of the American Supply and Machinery Manufacturers' Association and a member of the association's Executive Committee, Mr. O'Laughlin will continue to direct the sales activities of Commander in addition to assuming his new management duties.

★ ★ ★

#### GEAR GRINDING MACHINE EXPANDS PLANT FACILITIES

To implement its Machine Tool Division for the capacity to produce a new single-spindle screw machine, the Gear Grinding Machine Co., Detroit, Mich., has constructed an addition to its Christopher plant. The new masonry and steel building is said to provide a 33 per cent increase in floor space at this plant. These additional manufacturing facilities will provide adequate production for both screw machines and gear grinding machines.

In connection with the new addition, special attention has been given to re-vamping present production facilities. Great effort has been expended in setting up existing machinery and equipment to mesh smoothly with the newly established production lines.

★ ★ ★

#### LEHMANN BORING TOOL BECOMES DIVISION OF FULTON IRON WORKS

The purchase of the Lehmann Boring Tool Company of Novo Engine Company by Fulton Iron Works Co., St. Louis, Mo. has been announced by Walter A. Gantner, president of Fulton. The purchase includes all facilities of Lehmann Boring Tool, plant and production equipment, located at 4389

May, 1955



HERE'S A

# Frame-up

**TO GIVE YOU MORE FOR YOUR MONEY**

These two new Star Hack Saw Frames provide convenience features and quality features found in no other frames.



**EXAMPLE:**



Blades are easily, instantly changed simply by moving the exclusive STAR cam-action lever under the handle.

**EXAMPLE:**



A quick simple movement of the tension bar adjusts for 10-inch or 12-inch blades.



**STAR No. 20**

long the top-quality favorite of mechanics.

1412



Order from Your Star Distributor  
**CLEMON BROS., Inc.**  
MIDDLETOWN, N. Y., U.S.A.

Makers of Hand and Power Hack Saw Blades, Frames, Metal and Wood Cutting Band Saw Blades and Clemson Lawn Machines.

For more data circle 409 on Reader Service Card

May, 1955

modern machine shop 207

## news of the industry . . .

Duncan Avenue in St. Louis. Mr. Gantner stated that this new division of Fulton will continue to produce all types of boring tools (bars, blocks and cutters), both standard and special. Key management personnel will continue with the firm. T. J. Sleeter will continue as chief engineer and Russell

L. Cole as sales manager. All production supervisors and employees will also be retained.

★ ★ ★

### WARNER & SWASEY ELECTS OFFICERS AND DIRECTORS

Charles J. Stilwell, president of Warner & Swasey Co., Cleveland, Ohio, was elected chairman of the board at the directors' meeting following the annual meeting of the stockholders held recently. Walter K. Bailey, vice president of the company since 1942, was elected president. Other officers of the company were re-elected, and nine of the firm's present directors were re-elected by the stockholders for periods of from one to three years. Mr. Bailey joined Warner & Swasey in 1919, starting as a special apprentice. He became sales representative for the company in the Chicago area, advanced through various posts in the sales department, was made sales manager in 1939 and vice president in charge of sales in



**DY-NAMIC BALANCING**  
reduces stress, produces smooth operation of our crankshafts...and makes it so EASY TO LOCATE EXACT POINT OF UNBALANCE...  
**QUICKLY, ACCURATELY!**

says M. W. Stiller, Prod. Mgr., Joy Mfg. Co., Michigan City, Ind.  
A Model 375 "Bear" Machine is used here to balance crankshafts for portable air compressors.  
Photograph shows operator drilling away excess metal at point of unbalance.

Speed and accuracy are but two of many advantages which make "Bear" Dy-Namic Balancing the proven technique to reduce wear of valuable machinery . . . eliminate noise and vibration . . . and improve performance of the finished product.

SEND FOR FREE DY-NAMIC BALANCING MANUAL to learn of all the advantages of "Bear" Machines, 20 pages of tables, diagrams, application photographs and latest technological developments help show you how Dy-Namic Balancing can cut costs, mechanical failures and maintenance expense in your operation.



For your copy write: Bear Mfg. Co., Dept. M-25, Rock Island, Ill.

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**"BEAR"**  
STATIC AND DY-NAMIC BALANCING MACHINES  
balance rotating parts weighing from 4 oz. to 8 tons.

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## **Seven years service for STANOIL Industrial Oil at David Bradley Mfg. Works —No down time for lubrication**



Seven years ago David Bradley Mfg. Works installed 900 gallons of STANOIL Industrial Oil in an HPM press. There's been no down time required for lubrication maintenance since. A pump by-pass screen filter is the only filtering the oil receives, yet the system continues clean. In March, 1954, an analysis of the oil showed:

Viscosity @ 100° F.....980  
Color, NPA..... 6  
Neutralization No......11

STANOIL Industrial Oil has long been at work for Bradley. Successful operations with it in other equipment caused Bradley engineers to specify STANOIL for this installation.

The HPM double acting, fast traverse hydraulic press reported on here is used to draw the upper frames for the David Bradley Tri-Trac, compact farm tractor. The Tri-Trac is the newest implement in the Bradley line. Bradley has been making farm implements since 1832.

Like to know more about STANOIL? Perhaps it can serve you as efficiently as it is serving David Bradley. Lubrication specialists in any Standard Oil office will be happy to help. In the midwest, a call to one of them will bring a prompt response. Or contact: Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.



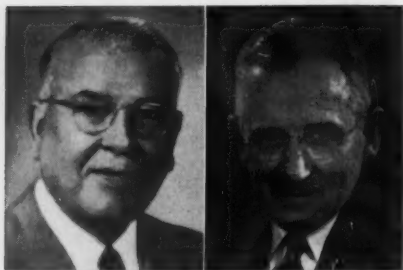
David Bradley Tri-Trac, handy piece of farm equipment gives farmer new opportunity for mechanization at low cost. Upper frame is part formed in HPM press.

L. R. Cummings (left), Standard lubrication specialist, inspects sample of STANOIL, with Robert C. Menken, Plant Engineer of David Bradley Manufacturing Works. Larry Cummings has been serving industrial customers for Standard Oil since graduation from the Standard's Sales Engineering School. His mechanical engineering degree from Tri-State College of Indiana qualified him for this work. Customers of Larry's find this experience and background pay off for them.



**STANDARD OIL COMPANY (Indiana)**

news of the industry . . .



Charles J. Stilwell (left) and Walter K. Bailey

1942, when he was also elected a director. In 1951, he became vice president in charge of manufacturing.

Mr. Stilwell, who has served as president of the company for the past 16 years, joined Warner & Swasey in 1910. He started special apprentice and

served in all departments of manufacturing and sales, advancing successively to the positions of New York district manager, general sales manager, vice president and director, and president.

★ ★ ★

### A.S.T.E. ELECTS OFFICERS AND DIRECTORS AT ANNUAL BANQUET

At its annual banquet held recently in Los Angeles, California, the American Society of Tool Engineers elected Dr. Harry B. Osborn, Jr., president to succeed Joseph P. Crosby. Dr. Osborn is technical director of the TOCCO Division, Ohio Crankshaft Company. Mr. Crosby is vice president of the Lapointe Machine Tool Company. In addition to Dr. Osborn, new officers of the society are H. C. McMillen, Philco Corp., Bedford, Ind., first vice president; H. E. Collins, Hughes Tool Co.,

## HIGH SPEED PRODUCTION CONTINUOUS OIL GROOVING

WICACO CONTINUOUS OIL GROOVER cuts grooves of all descriptions, internal or external, continuous or intermittent.

Send us samples for grooving. We will return them cut to specifications, with a record of time and cost estimate. No obligation.

*Ask For Descriptive Booklet And See  
How You Can Improve Your Production.*

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MACHINE CORPORATION

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WAYNE JUNCTION, PHILA. 44, PA.

Manufacturers of

Precision Machinery and Machine Parts  
Roller Bearing Twister Spindles—Spindle Oiling Machine  
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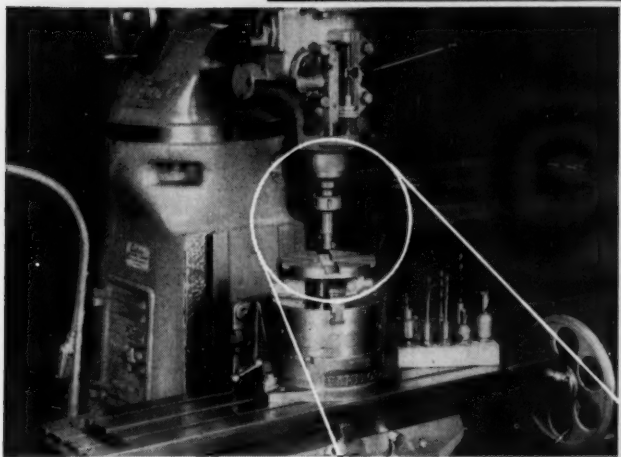
SINCE  
1868



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**NOW**

# Quick Change Tools... *for* SMALL MILLS...



★ 80% saving in  
down time

★ Only ½ inch tool  
clearance needed

★ Not necessary to move  
table when changing tools

★ Eliminates loosening and  
tightening draw bolt

Tools completely eliminate the time lost  
in changing conventional type tools...  
Complete sets are available, write for  
literature covering specifications and  
price.

Representatives in principal cities



**PORTAGE Double-Quick TOOL CO.**

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May, 1955

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**news of the industry . . .**

Houston, Texas, second vice president; R. C. W. Peterson, Peterson Engineering Co., Toledo, Ohio, third vice president; Wayne Ewing, Arrowsmith Tool and Die Co., Inc., Los Angeles, Calif., fourth vice president; Harold D. Long, Scully-Jones & Co., Chicago, Ill., treasurer; and John X. Ryneska, General

Electric Co., West Lynn, Mass., secretary. The society created the office of fourth vice president in place of the previous office of assistant secretary-treasurer.

The society elected three new directors; namely, William Moreland, Greenlee Brothers and Co., Rockford, Ill.; W. A. Thomas, Machine Shop and Stamping Division, Ford Motor Company of Canada, Ltd., Windsor, Ontario; and Mr. Peterson. Re-elected

to the board of directors were A. B. Clark, Haynes-Stellite Co., Cleveland, Ohio; W. G. Ehrhardt, Ehrhardt Tool and Machine Co., St. Louis, Mo.; G. A. Goodwin, The Master Electric Co., Dayton, Ohio; J. O. Horne, J. O. Horne Co., Rochester, N. Y.; C. M. Smillie, C. M. Smillie & Co., Ferndale, Mich.; and R. A. Smith, Pratt & Whitney Division, Niles-Bement-Pond Co., West Hartford, Conn. Dr. Osborn, Mr. Mc-

**Sensational NEW features**

# **FOSTORIA LOCALITE**

**The Perfect Lighting Tool  
for Machine Assembly  
Inspection**



**Directs  
Light  
Exactly  
as Needed**

**MODEL 2-WX-700  
Overall Length 31"**

**\$8<sup>12</sup>**

Each  
in std.  
pkg. of 8  
Less  
\$10.50 ea.



**Reflector**—New bell ventilated shape with 5½" orifice. Rotates 360°. Accommodates 100 watt A-21 or R-30 lamps. Also PAR-38, R-40, RS-40. Available with lens, if desired.

**Arm Joints**—New patented tension disc design. Easy, smooth action with only one hand. Available with 1, 2 or 3 arms.

**Base**—Universal for vertical or horizontal mounting. Also adaptable to outlet boxes. Collet revolves 360°.

**Wiring**—Medium screw porcelain socket. "T" rated toggle switch. 8 ft. POT-32 18-2 heavily insulated oil resistant wiring with molded plug.

**Finish**—Gray baked enamel. Reflector interior, high temperature White.

**WRITE** for complete catalog of Localite models for every industrial use.

**THE FOSTORIA PRESSED  
STEEL CORPORATION  
Fostoria, Ohio**

*Localites available through  
wholesalers everywhere*



Pat. U. S. Pat. Off.

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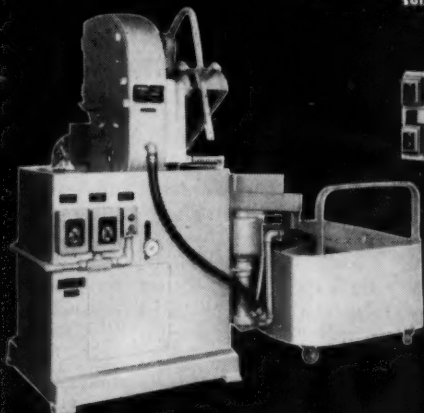
**Dr. H. B. Osborn, Jr.**



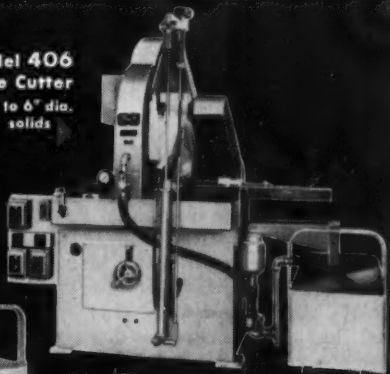
**ACCO**  
products

## Campbell Abrasive Cutters

**Model 406  
Abrasive Cutter**  
Capacity: Up to 6" dia.  
solids



**Model 223 Abrasive Cutter**  
Capacity: Up to 2" dia. solids,  
4" dia. tubing



### Quick cut-offs save money—here's how...

- 1. Superior Sales Engineering Service.** CAMPBELL engineers, experienced in every type of cutting problem, are available for consultation on YOUR cutting problems.
- 2. Economy and Speed of Operation.** CAMPBELL Abrasive Cutters are built to do every type of cutting job with accuracy, efficiency and

economy. Cuts are smooth and practically burr free.

- 3. Complete Line of Standard Machines.** CAMPBELL Abrasive Cutters are available in the widest variety of styles and models. They are available as fully automatic and semi-automatic equipment and have many exclusive features.

**ACCO**



Write today for Bulletin DH-301 on  
Campbell Abrasive Cutting Method

**Campbell Machine Division  
AMERICAN CHAIN & CABLE**

931 Connecticut Avenue, Bridgeport 2, Connecticut

For more data circle 415 on Reader Service Card

Wet and Dry  
Cutters and  
Nibblers

## news of the industry . . .

Millen, Mr. Collins, Mr. Ewing and Mr. Long were also elected to the board. As immediate past-president, Mr. Crosby will automatically become a board member.

★ ★ ★

### HARTFORD SPECIAL BUYS ROCKWELL DRILL UNIT LINE

Purchase of the complete line of Rockwell (Delta-Milwaukee) Hydraulic Drill Units from Rockwell Mfg. Co., Pittsburgh, Pa., by The Hartford Special Machinery Co., Hartford, Conn., has been announced by a joint statement by both companies. Hartford Special will assume the manufacture, sales and servicing of these versatile units which will be produced by Hartford Special's Machine Tool

Division in its new Simsbury (Connecticut) plant.

The transfer of special equipment, tools and inventory to Simsbury from Rockwell's Pittsburgh plant has been effected. In addition, key sales, engineering and production personnel of Rockwell's Drill Unit Division have been retained by Hartford Special and will relocate in the Hartford area.

★ ★ ★

### CANADIAN INDUSTRIAL TOOL AND EQUIPMENT SHOW

The Canadian Industrial Tool and Equipment Show, Montreal, formerly known as the Montreal Industrial Tool and Equipment Show, is scheduled to be held in the Show Mart Building, Montreal, October 24 to 28, 1955. The show will be of a national character, the only one in Canada devoted exclusively to the display of tools for in-

## Commander LEAD-MATIC Tapper

Automatic Tapper with Lead Screw  
FOR HIGH PRODUCTION PRECISION TAPPING

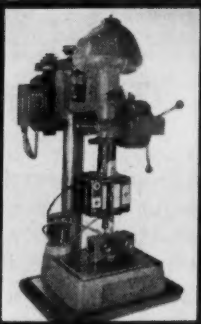
- Precision Ground Lead Screws Assure Finest Threads
- Electrically Controlled Cycle or Jog Tapping Action
- Hand, Foot or Fixture Switch Control
- Easily Adapted to Any Drill Press
- Range #0 to 3/4"

Built for high production tapping . . . precision or otherwise, the Commander Lead-Matic Tapper makes any drill press a precision tapping unit, even with inexperienced operators. Electric control of Cycle or Jog tapping action provides versatility to handle any job . . . automatic tap reversal eliminates drill press motor reversing and speeds tapping. Compact, ruggedly built, easy to operate, the Commander Lead-Matic Tapper will cut your tapping costs and reduce rejects to a minimum.

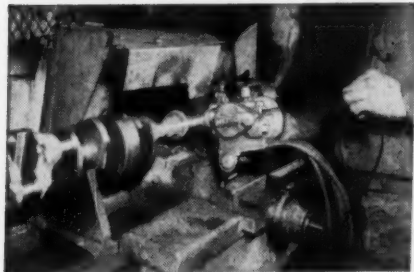
Write for illustrated circular and  
name of nearest Distributor.

## Commander MFG. CO.

4224 W. KINZIE ST. • CHICAGO  
PRODUCT OF COMMANDER . . . BUILDER OF PRODUCTION TOOLS



# when mistakes happen...



Automotive crankshaft being brought up to inspection standards with metallizing. This automotive manufacturer formerly used plating for this type of salvage, worked one per hour. With metallizing, the salvage operation requires only 5 to 10 minutes per shaft, including surface preparation.



## Free Bulletin

Get the full story on metallizing in production salvage. Bulletin 57-C describes and illustrates the procedures, provides data on typical parts, with interesting photo-micrographs showing the unique bonding action of Sprabond Wire. Send for a copy.



## Metallizing Engineering Co., Inc.

1111 Prospect Ave., Westbury, L. I., New York • cable: METCO  
In Great Britain:  
METALLIZING EQUIPMENT COMPANY, LTD.—Chobham near Woking, England

...and they do in any busy machine shop, there's no need to scrap a mis-machined or otherwise damaged machine part that represents an investment of many expensive man-hours.

Parts like these are brought up to inspection standards quickly, easily and inexpensively with metallizing.

And with the new molybdenum metallizing wire, Sprabond, the only surface preparation required is cleaning. The molybdenum forms a molecular bond with the surface being rebuilt. Little heat is generated, eliminating any danger of warpage.

What's more—users have found that the extreme hardness of the molybdenum coating, and its microscopic porosity which provides superior lubricating characteristics, improve its "wear-ability" over ordinary bearing surfaces as much as 25 times. You haven't just salvaged a part—you've improved it.

The trade name, SPRABOND WIRE, is the property of Metallizing Engineering Co., Inc.

DON A. WATSON  
METALLIZING ENGINEERING CO., INC.  
1111 Prospect Ave., Westbury, Long Island, N. Y.

☐ Please send me Bulletin 57-C.

☐ Please have Metco Field Engineer call.

Name

Company

Street

City  Zone  State

For more data circle 417 on Reader Service Card

**news of the industry . . .**

dustrial plants. The show will be attended by production officials, engineers and top management from all classes of industry by invitation. The general public is not invited. All who attend will be registered. The show will be sponsored by The Foremen's Club of Montreal and will have the cooperation of all the different production

societies. The show manager is E. M. Wilcox, with offices at 4585 Sherbrooke Street West, Montreal, and 19 Melinda Street in Toronto.

★ ★ ★

**HELLER BROTHERS APPOINTS  
A. M. THOMAS DIRECTOR  
OF SALES**

George Hodapp, president of Heller Brothers Co., Newcomerstown, Ohio,

has announced the appointment of A. M. Thomas as director of sales, succeeding Lawrence M. Rich. Mr. Thomas started with Heller Brothers Company in the St. Louis territory and was made Chicago district manager in 1951. Heller Brothers makes practically every size and type of file, including Nucut, Vixen and American-Swiss brands. The firm also produces hand tools, including ham-

**CYCLONE  
SEPARATION**

**FOR MORE EFFICIENT  
DUST COLLECTION  
—FILTERS LAST LONGER**



Almost all industrial dusts can be collected more efficiently by Dustkop. Thirty-seven standard models ready to use! Reduce installation costs — save space. Write for descriptive literature.

**ALSO A COMPLETE LINE  
OF MIST COLLECTORS**

**DUSTKOP  
STOPS DUST**

**AGET MANUFACTURING COMPANY**  
1390 EAST CHURCH ST., ADRIAN, MICH.

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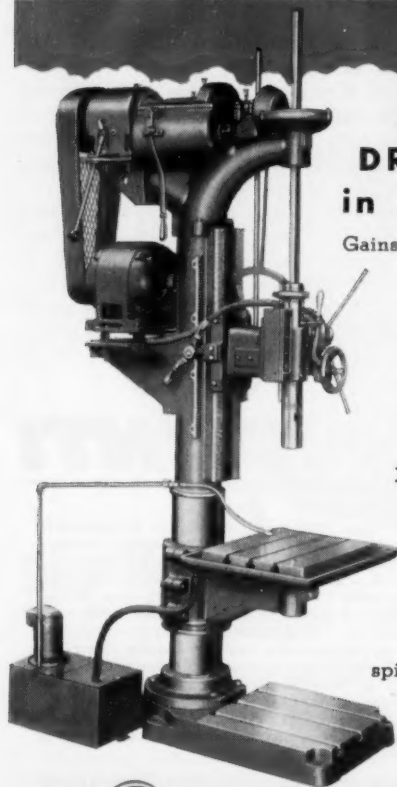


Mr. A. M. Thomas

# NOTICE

*The New*

## SIBLEY MODEL D DRILLING MACHINES in 24" and 28" SWING



Gains greater productivity and operator efficiency from V-belt drive direct to a 4-speed geared transmission, controlled by a conveniently located lever. 4-station switch at front of machine includes an "inching" button for easy change of speeds.

25" head travel on hand-scraped column; 11" spindle feed; 1 3/4" drilling capacity in mild steel. The heavy table arm assures rigidity and swings on column, to make the machined base accessible for a working surface.

Standard equipment includes automatic spindle stop; geared power feeds; back gears.

Model D-24 Drilling Machine is illustrated complete with coolant pump and fittings, electrical reversing, 5 H.P. motor, magnetic starting switch, rectangular oil groove table.

# SIBLEY

MACHINE & FOUNDRY CORP.

SOUTH BEND 23, INDIANA

SIBLEY MACHINE & FOUNDRY CORP.  
Dept. MM55, South Bend 23, Indiana  
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Name \_\_\_\_\_ Title \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_

For more data circle 419 on Reader Service Card

May, 1955

modern machine shop 217

## news of the industry . . .

mers, hatchets, trowels, automotive body tools and farriers tools. Branch offices are maintained by Heller Brothers in New York City, Chicago and Detroit.

★ ★ ★

### DREIS & KRUMP COMPLETES NEW MANUFACTURING BUILDING

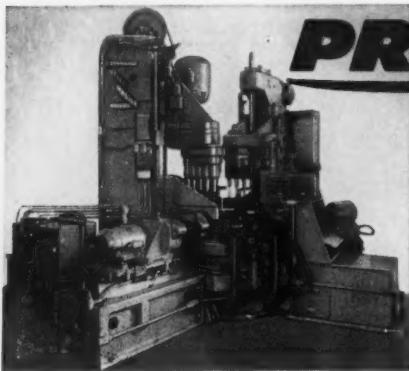
Dreis & Krump Mfg. Co., Chicago, Ill., has announced the completion of Building No. 3 which adjoins the other plant buildings. The new building provides 40,000 square feet of floor space and is now fully equipped to handle the welding, frame machining and production-line assembly of its smaller models of press brakes and presses of from 11 to 150-ton capacities. The com-

pany claims that these new facilities will considerably increase production and shorten deliveries.

★ ★ ★

### INDUSTRIAL DIAMOND ASSOCIATION ELECTS NEW OFFICERS

At its Tenth Convention and Annual Meeting held recently in Hollywood, Florida, the Industrial Diamond Association elected new officers and directors. The new officers are as follows: president, Piet Smit, J. K. Smit & Sons, Murray Hill, N. J.; first vice president, Jan Taeyaerts, Precision Diamond Tool Co., Elgin, Ill.; and second vice president, Willard L. Huber, Diamond Tool Research Co., New York, N. Y. Continuing as secretary-treasurer and executive manager is Athos D. Leveridge of New York



STANDARD'S S.O. 3515

UNITED STATES SALES REPRESENTATIVES: ARNOLD J. WERNER CO., NEW CENTER BUILDING, DETROIT 2, MICHIGAN

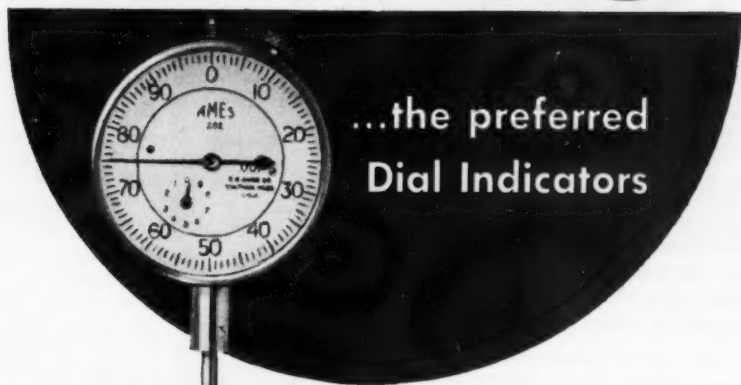


**STANDARD  
MACHINE AND  
TOOL CO., LTD.  
WINDSOR, ONTARIO**

For more data circle 420 on Reader Service Card



# AMES



**Over 16,000,000 cycles**  
**without wear or loss of accuracy ...**  
**how many more will they complete?**

Several Ames Model 282 Long Range Dial Indicators *with plain bearings* are currently giving an amazing demonstration of performance and endurance under test conditions. After more than 16,000,000 cycles each, at 240 strokes per minute, 9 hours a day—they still have their original accuracy!

The reasons for this outstanding record? Simply high quality materials, simple basic design, rugged construction ... and expert craftsmanship.

*If you would like to have our recommendations on your measurement problem, send blueprints and specifications. And ask for your free copy of our catalog on Ames micrometer dial indicators and gauges.*



Representatives in  
principal cities

**B. C. AMES CO.**

29 Ames Street  
Waltham 54, Mass.

Mfrs. of Micrometer Dial Gauges • Micrometer Dial Indicators

For more data circle 421 on Reader Service Card

May, 1955

modern machine shop 219

**news of the industry . . .**

City. New directors are John W. Cowan, Wayne Wire Die Co., Hillside, N. J.; Martin Hoerer, Super-Cut, Inc., Chicago, Ill.; Stephen W. Hofman, U. S. Industrial Diamond Corp., New York, N. Y.; Walter J. Meinhardt (retiring president), Meinhardt Dia-

mond Tool Co., Chicago, Ill.; and H. B. Ziegler, Wheel Trueing Tool Company of New Jersey, Bloomfield, N. J.

★ ★ ★

**NEW ENGINEERING BUILDING  
STARTED AT CLEVELAND CRANE**

Excavation has started on a new \$300,000 Engineering Building at The Cleveland Crane & Engineering

Co., Wickliffe, Ohio. It will be a 128 x 71-foot brick building with a second floor section at the rear measuring 25 x 138 feet. Hallways connecting with the present main office building will be provided. The new building will accommodate 80 engineers and draftsmen engaged in designing Cleveland overhead traveling cranes, Cleveland Tramrail overhead materials handling equipment, Steelweld bending presses, heavy power presses and metalcutting shears which the company manufactures.

The entire building will be air - conditioned and provided with all the latest features, including the newest complete ceiling-coverage lighting

over **7,500** Different Selections  
For Immediate Delivery!



**Quality-Famous, Heavy Duty  
AIR AND HYDRAULIC**

**CYLINDERS**

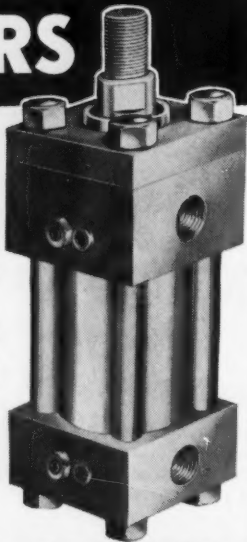
**now "in stock" for  
immediate shipment to you  
in popular sizes, mountings**

Eliminate costly production delays—speed-up your design and replacement programs—with this greatest quality selection ever offered on such fast delivery service.

**AIR CYLINDERS, 200 psi, 1½" through 8" bores, strokes up through 36", over 15 popular mountings, cushioned and non-cushioned.**

**HYDRAULIC CYLINDERS, 2000 psi, 1½" through 5" bores, strokes up through 36", over 15 popular mountings, cushioned and non-cushioned.**

Larger bores (up through 20" air, 12" hydraulic) and longer strokes (up to 22 feet) available on longer delivery.



**Write for Complete  
Data and Prices**



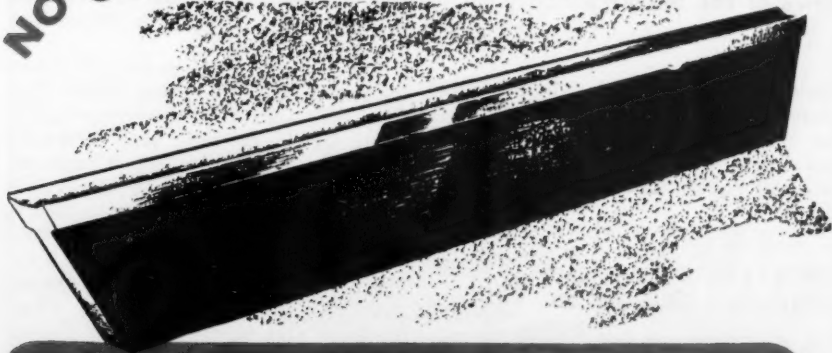
**MILLER FLUID POWER COMPANY**  
(Formerly Miller Motor Co.)

2024 N. Hawthorne Ave., Melrose Park, Ill.

**CYLINDERS • BOOSTERS • ACCUMULATORS**  
Sales and Service—From Coast To Coast

For more data circle 422 on Reader Service Card

**NO OTHER CUT-OFF BLADE LIKE THIS!**



*None can do what* **EMPIRE'S**  
**Luers Cutting-off Blade**  
*will do*

Empire Tool Co. is the **LEADER** in cut-off blade developments—backed by twenty years' experience in cut-off blade manufacture.

Cut-off blades are tools subject to conditions different from those of other tools and will perform most efficiently only when specialists' recommendations are followed.

Available from stock are blades of four types of high speed steels developed to meet the demands of cut-off operations. And on short notice you can get blades of cast alloys and tungsten carbide.

Made under license issued by John Milton Luers Patents, Inc.

Made in U.S.A.

**EMPIRE**  
**TOOL COMPANY**

8776 GRINNELL AVE.

DETROIT 13, MICHIGAN

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May, 1955

modern machine shop 221

## news of the industry . . .

equipment. Offices and individualized conference rooms will be provided for the director of engineering and the chief engineers of the Cleveland Tram-rail and Heavy Machinery Divisions.

★ ★ ★

### SOCIETY OF DIE CASTING ENGINEERS ORGANIZED

A new technical society, named the Society of Die Casting Engineers, has been formed to foster and further technological advances in the field of die casting and finishing of metals and die molding of plastics and powdered metals. The main objective of the society will be the exchange, accumulation and dissemination of the latest information and knowledge in the arts and sciences of die casting and related

arts. A major aim is the development of modern standards for the die casting industry.

The first chapter to be formed within the new organization is the Detroit No. 1 Chapter. Officers of the group for the group for the calendar year 1955 are: president, Harris Shimel, Chevrolet-Bay City; vice president Marshall Aberle, H & M Industries; secretary, George Griffenham, Mergraf Oil Company; recording secretary, John Lapin, Saginaw Bay Industries; treasurer, Arthur Tinetti, A.C. Spark Plug; librarian and historian, Mike Tenenbaum, Lester Phoenix Machine Company; and trustees, Harry Erickson of A.C. Spark Plug, Herbert Roushkolb of Cleveland Automatic Machine Company, and John Miller of H & M Industries.

Memberships in the Society of Die Casting Engineers is open to those whose business activities relate to die casting, die molding, finishing and related arts. The new society's national headquarters and offices will be located at 19370 James Couzens Highway, Detroit 35, Michigan.

★ ★ ★

### FRANKLIN FARREL, III, ELECTED PRESIDENT OF FARREL-BIRMINGHAM

At a recent meeting of the board of directors, which directly followed the



Diameter up to .125" — Length up to 1"

Hardened and Ground

Taper Tolerance .0001" In Length Of Pin

Diameter Tolerance .0005"

Send Specifications for Quotations

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CENTERLESS  
GRINDING CO.**

5505 CEDAR AVE. Phone EN 1-3412 CLEVELAND 3, O.

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222 modern machine shop

**BREMIL**  
The IMPROVED Compound Lever Shears

ALL ALLOY  
FULLY  
GUARANTEED

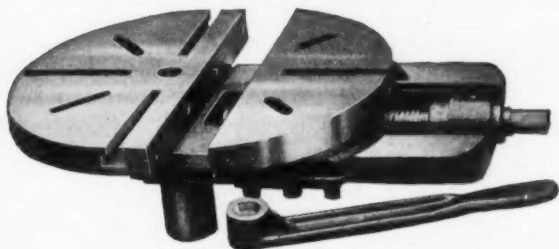


**PORTABLE**  
No. 1 cuts up to No. 11 gauge strip or sheet  
No. 2 cuts up to 1/4" steel plate.  
**BREMIL MFG. CO.**  
1020 Holland St., Erie, Pa.

For more data circle 425 on Reader Service Card

May, 1955

**For Faster, SAFER Work  
in Your Maintenance Department**



**Under Our  
FREE  
TRIAL  
OFFER**

## **Try the MODERN SAFETY DRILL TABLE**

Combines a drill table, a vise, a set of parallels and V block. No more lost fingers, from hand held jobs that slip. No more 30 minutes set-ups for a 1 minute drilling operation. Made in 6 sizes, from 8" to 28" dia. We guarantee each Safety Drill Table will save its cost on labor alone in 6 months, to say nothing of plant down time when vital maintenance is delayed even a few minutes

**WRITE FOR FREE FOLDER**

Shows many typical set-ups, and use in radial drills. Complete specifications on all models. Covers **MONEY BACK GUARANTEE** and **30 DAY FREE TRIAL OFFER**.



**MODERN MACHINE TOOL CO.**  
*Jackson, Michigan*

For more data circle 426 on Reader Service Card

**news of the industry . . .**

annual meeting of stockholders, Franklin Farrel, III, was elected president of Farrel-Birmingham Co., Inc., Ansonia, Conn. Mr. Farrel succeeds Franklin R. Hoadley who has served as president since 1945 and who is retiring.

At the same meeting of the board of directors, Alton Austin Cheney was

re-elected chairman of the board, and Austin Kuhns was re-elected chairman of the finance committee. Three new vice presidents and a secretary and general counsel were elected. The new vice presidents are Edward S. Coe, Jr., manager of the two Connecticut plants, who will also serve as assistant to the president; Robert M. Honegger, general manager of the company's Buffalo plant; and Joseph LeMay, who will continue as treasurer. Julius G. Day, Jr., is secretary and general counsel.

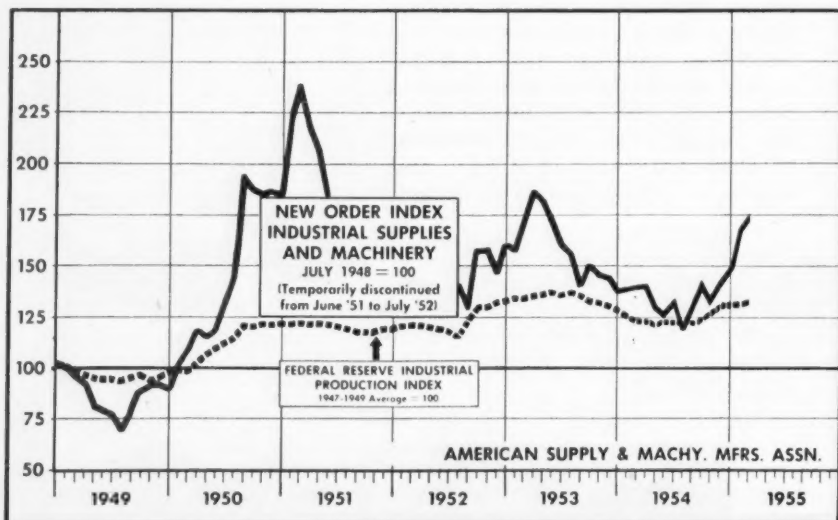


## INDUSTRIAL SUPPLIERS AND MACHINERY NEW ORDER INDEX

The new order index of industrial supplies and machinery continued its climb for the fourth consecutive month in February to reach the highest point in 22 months. The American Supply and Machinery Manufacturers' Association reports the new order index for February at 175.1. This is the highest reported since April 1953, when it reached 182.1.

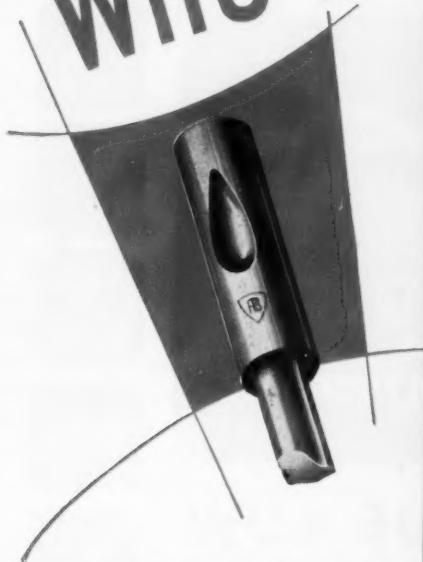
The index measures the flow of orders received by Association members who are manufacturers of production and maintenance equipment, tools and supplies selling to industry through industrial distributors. The value of orders received during February was more than 10 per cent above January and more than 75 per cent above the base month of July 1948.

The Federal Reserve Industrial Production Index pumped two points to 133.





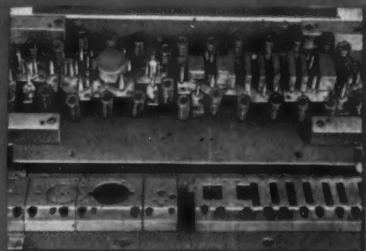
# WHO USES R-B PUNCHES



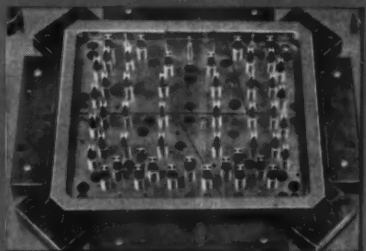
Through many years of providing America's leading industries with interchangeable and standardized punches, die buttons and retainers, R-B has built a reputation for increasing production, lowering costs and saving time. R-B case histories of savings and benefits include users of cam actuated, multi-station progressive, forming, blanking, piercing, embossing and combination dies of all sizes and types.

Why don't you investigate the cost saving features of R-B equipment?

Use R-B Engineering Service for Your Tough Piercing Problems.



**PIERCE DIE**



**DRAW and PIERCE DIE**



**PROGRESSIVE DIE**

## **RICHARD BROTHERS PUNCH DIVISION ALLIED PRODUCTS CORPORATION**

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COMPANY \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_



## *Also Produced in* **OTHER ALLIED PLANTS**

SPECIAL COLD FORGED PARTS  
STANDARD CAP SCREWS  
PRECISION GROUND PARTS  
SHEET METAL DIES  
MADE OF FERROUS ALLOYS,  
ZINC ALLOYS OR PLASTICS

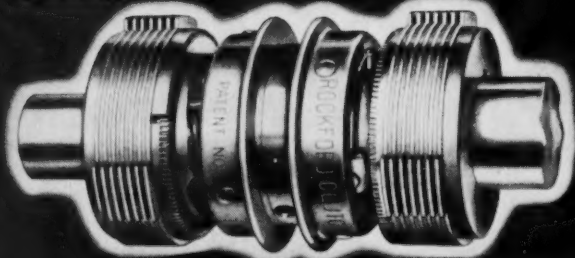
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May, 1955

modern machine shop 225

# ROCKFORD

**PULLMORE**



**MULTIPLE-DISC**

## HIGH TORQUE LOW ENGAGING PRESSURE

**COMPACT DESIGN**

**HIGH TORQUE\***

**HIGH-RATIO LEVERS**

**POSITIVE NEUTRAL**

**PRECISION BUILT**

**LONG WEAR LIFE**

**EASY ADJUSTMENT**

\* PULLMORE discs provide high capacity and efficient lever design enables light engaging pressure. Discs are accurately made from special clutch-disc materials and are tested for flatness. Made in single and double types, for operation in oil or dry, PULLMORE clutches have capacities from 1 to 90 H.P. at 500 R.P.M. They handle loads of much greater than rated capacity, when operated at higher speeds.

**Send for This Handy Bulletin**

Shows typical installations of **ROCKFORD CLUTCHES** and **POWER TAKE-OFFS**. Contains diagrams of unique applications.



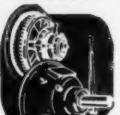
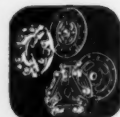
Furnishes capacity tables, dimensions and complete specifications.

**ROCKFORD CLUTCH DIVISION** BORG-WARNER

▲ 300 Catherine Street, Rockford, Illinois, U.S.A. ▲

# CLUTCHES

For more data circle 428 on Reader Service Card



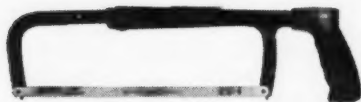
# 2 new frames

COLORFUL FUNCTIONAL DESIGN

The new Victor No. 10 and No. 15 frames fit either 10-inch or 12-inch blades, yet are built around a solid, one-piece steel backbone, the most rigid construction ever devised. New under-the-handle lever-lock automatically — instantly — puts correct tension on every blade. Colorful molded Tenite handles appeal to eye and hand.

## VICTOR No. 20

LIST PRICE \$3<sup>25</sup>



Long-time mechanics' favorite. Adjustable for 10-inch or 12-inch blades. Extra-leverage tension lock.

**Sold Only Through  
Recognized Distributors**

## VICTOR No. 10

LIST PRICE \$1<sup>89</sup>

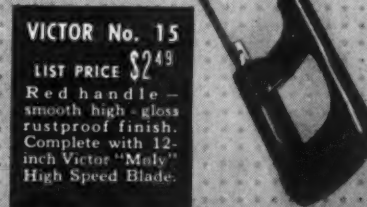
Yellow handle — long-wearing rust-proof crackle finish. Complete with 12-inch Victor Unbreakable Special Flexible Blade.



## VICTOR No. 15

LIST PRICE \$2<sup>49</sup>

Red handle — smooth high-gloss rustproof finish. Complete with 12-inch Victor "Moly" High Speed Blade.



# VICTOR

1414

SAW WORKS, INC. • MIDDLETOWN, N.Y., U.S.A.

Makers of Hand and Power Hack Saw Blades; Frames; Metal & Wood Cutting Band Saw Blades.

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May, 1955

modern machine shop 227

## new shop equipment

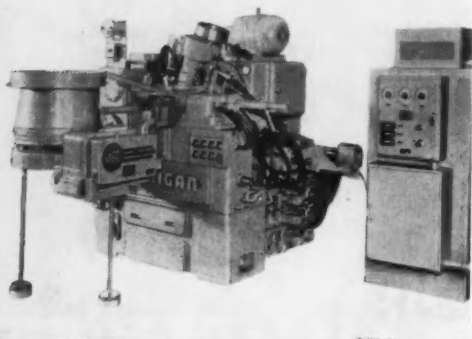
*Descriptions of new machine, tools  
and materials for the metalworking  
industry*

### **AUTOMATED HOBBER PRODUCES GEARS WITHIN CONTROLLED SIZE LIMITS**

Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich., has equipped the 1445 Ultra-Speed Hobber for the automatic production of gears within controlled specified size limits. According to the manufacturer, constant and accurate monitoring of gear size during 100 per cent of the gear production cycle automatically adjusts center distances between the hob and the gear blank to compensate for tool wear or size variation due to temperature changes. This automated

gear production line is claimed to actually "think" for itself. Gear blanks are placed in the hopper-type loader and emerge as accurate size gears in minimum cycle time. Gear size tolerances are checked during 100 per cent of the production by a Michigan 3-Way Gear Classifier. Any variation from present tolerances — caused by tool wear, and so on — is said to be immediately picked up by the classifier and the proper signal relayed to the Michigan Gear Controller.

The controller performs several functions; namely, it automatically adjusts the hobber's center distance, keeping the gear sizes within specified tolerances; it keeps a statistical record of production — the number of rejects, total production, and so on; and it shuts down the "production line" when the total predetermined gear production is reached, or should the helix angle not meet specifications. Once the hobbing machine is set into motion, the only operation required of the operator is to keep the automatic loader full of gear blanks. Should production shut down automatically, such as happens when the machine's hob shifter reaches its limit, a light on the controller panel flashes, and the operator merely checks the controller counters to see where the difficulty lies. Shut downs by the hob shifter automatically indicate that the hob requires sharpening.



**Michigan Automated 1445 Ultra-Speed Hobbing Machine for automatic gear production**

The machine is said to be capable of producing both helical and spur gears while checking each gear for undersize, oversize, correct size, eccentricity and plus or minus helix angle.

For more data circle 73 on Reader Service Card

★ ★ ★

### **LATHE FEATURES INDEPENDENT SPINDLE SPEED AND FEED CONTROL**

Push-button infinite spindle speed control and an independent electric carriage and cross slide are offered in the Model HLV High-Speed Precision Toolroom and Production Lathe manufactured by Hardinge Brothers, Inc., Elmira, N. Y. Spindle speeds are controlled from a push-button control box, located over a redesigned headstock, which allows any speed between 125 and 3,000 r.p.m. to be chosen simply by pressing the "Faster" or "Slower" button. The exact spindle speed is indicated at all times on the control box. Rate of carriage and cross slide feed is controlled independently from the spindle speed by a variable electric feed control box on the right end of the machine. The lathe does not have to be

stopped to make an changes in either speed or feed.

The Model HLV also features a lever-operated collet closer which provides fast, easy collet regulation and provides for instantly adjustable collet tension throughout the full range from light to heavy holding power. A built-in spindle hand-wheel provides a safe, convenient means for rotating the spindle by hand when indicating or inspecting precision work. The fully-enclosed headstock features an extra-large 1 1/16-inch collet capacity with a Hardinge 5C collet. The preloaded ball bearing spindle is claimed to eliminate all end and radial play and is permanently lubricated to operate continuously at all speeds without attention.

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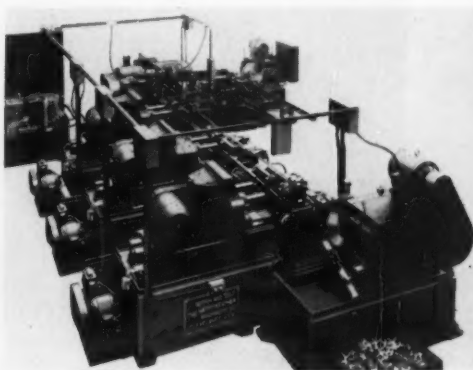
★ ★ ★

### **15-STATION TRANSFER MACHINE USES STANDARD MACHINE UNITS**

The Motch & Merryweather Machinery Co., 888 E. 70th St., Cleveland 3, Ohio, has designed a 15-station inline type transfer machine utilizing standard machine units. The part pro-



**Hardinge Model HLV Precision Toolroom and Production Lathe with independent controls.**



**Motch & Merryweather 15-Station Transfer Machine utilizing standard machine units**

### **new shop equipment . . .**

cessed, a refrigerator cylinder bracket, is produced from standard  $3 \times 2\frac{1}{2} \times \frac{1}{2}$ -inch hot rolled angle iron. Production is said to be 380 pieces per hour at 100 per cent efficiency. The first station saws the angle iron to accurate length so that three equal length pieces can be discharged at the final station. The saw unit discharges the piece into a lateral conveyor for loading by index into the main straight line transfer machine. At the first machining station, the angle iron section is milled on one face and one edge. From this station the part is moved into the first barrel-type turn-over fixture, thence to the second machining station for milling the other face and edge.

The next station drills and reams three holes. Following the drilling and reaming, 12 holes are drilled and six holes reamed by a similar drill-ream setup. The drilling and reaming are

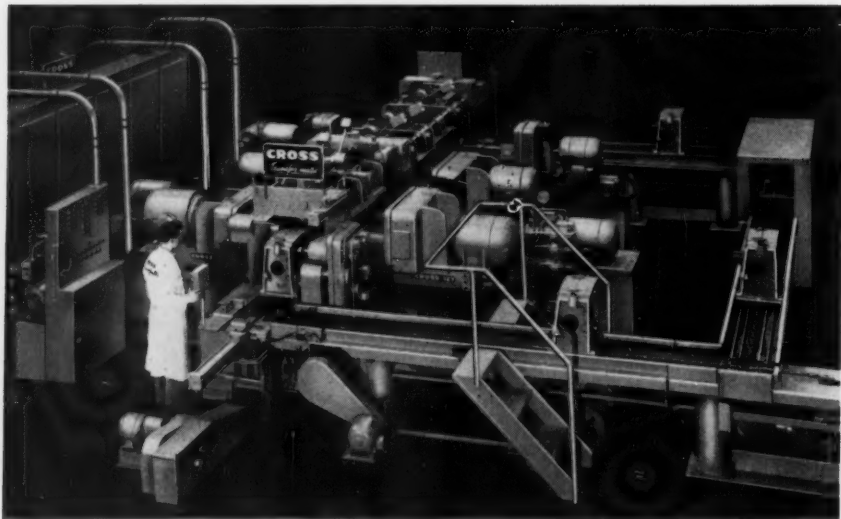
followed with a second barrel-type turn-over fixture which positions the parts for the end milling of seven holes. The milling, reaming and drilling stations are equipped with 15-h.p. way-type power units with multiple-spindle heads. At the last station, a saw head equipped with two circular saw blades cuts the stock into three completed pieces.

For more data circle 75 on Reader Service Card

★ ★ ★

### **UNIT MACHINES REAR AXLE DIFFERENTIAL GEAR HOUSINGS**

A Transfer-matic for machining rear axle differential gear housings has been designed by The Cross Co., Detroit 7, Mich. The machine is claimed to complete 155 gear housings per hour at 100 per cent efficiency with one operator. It has nine stations — one for loading, four for boring, one for tapping, two for indexing and one for visual inspection.



**Cross Transfer-matic for machining 155 rear axle differential gear housings per hour**



**Shown for the first time—now on display in the following cities**

THE NEW SHELDON-BUILT

# Sebastian

**13" Geared Head  
PRECISION LATHE**

Now you can see this new precision tool room lathe for the first time in our distributor's show rooms. Rigidly built, this lathe combines rugged power with extreme accuracy—has the work capacity and easy operating features of larger, more costly lathes.

Be sure to see this new lathe. Run it, test its "feel" and performance before you buy. If you are unable to see this new lathe with its many outstanding features, write for complete information.



Heavy, Multi-spined Spindle • Large  $1\frac{3}{4}$ " hole through spindle • Wider, deeper, heavier bed • 60 pitch gear box • Easy shifting speed dial • Cam-action tailstock clamp • "Zero Precision" tapered roller Spindle Bearings • One Shot lubrication system.

Write for circulars on 13 and 15" Sebastian Geared Head Lathes

## SHELDON MACHINE CO., Inc.

*Builder of Sheldon Lathes, Milling Machines, Shapers and Sebastian Lathes*

For more data circle 430 on Reader Service Card

May, 1955

**ATLANTA**  
Scott Machine Co.  
**BUFFALO**  
O'Connell Machinery Co.  
**CAMBRIDGE**  
Joseph Beal & Co., Inc.  
**CHICAGO**  
Boyd-Wagner Company  
Crown Supply Company  
**CINCINNATI**  
Cincinnati Machinery Co.  
Cox Machinery Co.  
**CLEVELAND**  
Garco Machinery, Inc.  
Strong, Carlisle &  
Hammond Co.  
**COLUMBUS**  
E. W. Smith Machinery Co.  
**DALLAS**  
Briggs-Weaver  
Machinery Co.  
Machinery Sales Co.  
**DETROIT**  
J. Lee Hackett Co.  
Chas. A. Strelinger Co.  
**ELMIRA**  
Gierston Tool Co., Inc.  
**HARRISBURGH**  
General Machinery &  
Equipment Co.  
**HOUSTON**  
Rex Supply Company  
**INDIANAPOLIS**  
Indianapolis Machinery &  
Supply Co.

**JACKSON, MICH.**  
F. P. Miller Co.  
**KANSAS CITY**  
Ellfeldt Machinery &  
Supply Co.  
**LOS ANGELES**  
Harron, Rickard &  
McCone Co.  
Seaboard Machinery Co.  
**MILWAUKEE**  
State Machine Tool Co.  
**NEWARK**  
Ralph Hochman & Co.  
**NEW YORK**  
Morris Abrams, Inc.  
DoAll Eastern Company, Inc.  
Reiner Machinery Corp.  
**OAKLAND**  
Delta Equipment Agency  
**PHILADELPHIA**  
Delta Equipment Company  
Samuel Machinery Co.  
**PORTLAND**  
Portland Machinery Co.  
**PROVIDENCE**  
Reynolds Machinery Co.  
**SAN ANTONIO**  
San Antonio Machinery &  
Supply Co.  
**SAN DIEGO**  
Hammond Machinery &  
Supply Co.  
**SAN FRANCISCO**  
C. W. Marwedel  
**SEATTLE**  
Dawson Machinery Co.  
West Coast Machinery Co.  
**ST. PAUL**  
Sales Service Machine  
Tool Co.  
**WASHINGTON, D.C.**  
Noland Co., Inc.  
**WEST HARTFORD**  
Robert E. Morris Co

**A-5  
\$187500**

F.O.B. Chicago  
Less electrical  
equipment

4205 North Knox Avenue  
Chicago 41, Illinois

modern machine shop 231

## **new shop equipment . . .**

tion. The operations include rough and semi-finishing of the pinion bores, rough boring, semi-finish boring and tapping the cross bores.

Because of the shape of the differential gear housings, pallet-type workholding fixtures are used. The parts

are clamped in the fixtures with hydraulic power wrenches. The fixtures move from station to station and return to the loading station automatically. Both the standard and special parts of the Transfer-matic are completely interchangeable to provide easy maintenance and flexibility for part design changes. Electric and hydraulic construction are to Joint Industry Conference standards. Other features of the machine include hardened and ground ways, tandem drive for locating the pins, hydraulic feed and rapid traverse, automatic lubrication, oil-mist lubrication for taps and a drag-chain chip conveyor.

For more data circle 76 on Reader Service Card

★ ★ ★

### **AUTOMATIC MACHINE GRINDS SPUR AND HELICAL GEARS**

Belock Instrument Corp., College Point, N. Y., has developed a fully-automatic precision gear grinder for spur and helical gears. Although it is a high production machine, it is claimed to be so designed as to make short run jobs economically feasible. The machine features built-in tooling. A special involute dial is set to the proper index number to produce the proper involute shape for the particular size gear to be ground. Three change gears are selected for the number of teeth on the gear, and the proper dressing cam



#### **PART FEEDER**

Automatic Part Feeders are adaptable to production jobs requiring the handling of small parts into hopper. They are arranged and fed down track in proper order.



#### **Single & Multiple Spindle Magazine Feed Power Screw Driving Machines**

For driving screws faster in products assembled with screws. These machines operate easily and require very little attention or adjustment when put in production.

*Send sample parts when writing for quotation.*

**COOK & CHICK CO.**

2415 WEST 24TH ST., CHICAGO 8, ILL.

For more data circle 491 on Reader Service Card



#### **CARROLL AND JAMIESON LATHES**

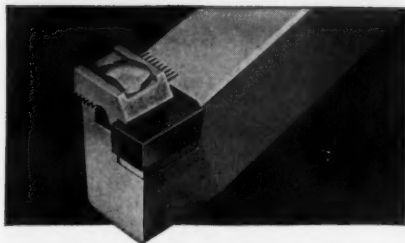
● This 16" lathe is equipped with 12 speed geared head, motor drive, and Timken mounted spindle. It's modern in design — with liberal dimensions.

*Write today for descriptive bulletin 39-A-10.*

**16"**

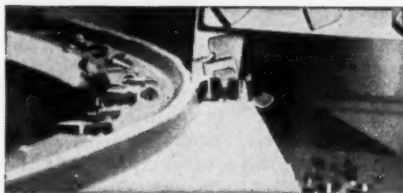
**THE CARROLL & JAMIESON MACHINE TOOL CO.** BATAVIA, OHIO, U.S.A.

For more data circle 432 on Reader Service Card



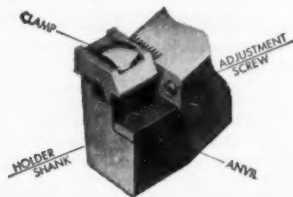
### Chip-Hog Heavy-Duty Turning Tools

This line of standard tools recently announced by the Gairing Tool Company is proving this company's claim for "maximum feeds and speeds on any machine." So rigidly constructed as to allow the use of harder carbide grades for given shank sizes, their performance is often limited only by the available machine horsepower.



### Case Data Show High Feeds and Speeds

Illustration shows CHIP-HOG at work taking a 1" to 1 1/4" roughing cut around an armor-cast gun turret. With a feed of 3/64", a surface speed of 150-175 per minute was maintained. Your Gairing representative has many more convincing data to show you, mostly on machining hard and tough materials.

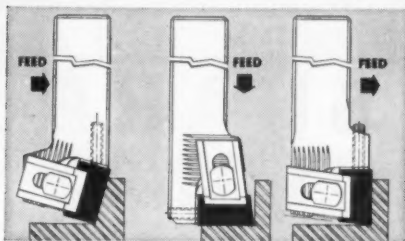


### Rugged Parts, Quick-Changed Inserts

With carbide insert removed, holder

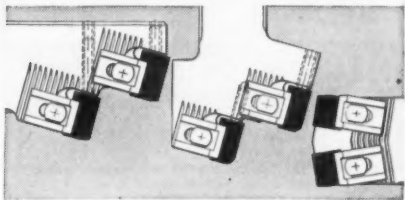
For more data circle 433 on Reader Service Card

shows heavy, high-alloy, heat-treated shank. Clamp adjusts sideways on buttress-type serrations, cannot slip. Anvil of hardened and ground tool steel supports insert, prevents holder damage so common in brazed-on tools. Allen screw provides forward adjustment.



### Stocked in 3 Styles, Several Sizes

Style 'B' (left above), for straight turning on lathe or boring mill (and for vertical work on planers) is made with shanks 1" by 1" up to 2" by 2". Style 'F' for plunge cutting from the cross slide, and style 'G' for turning up to, or facing a shoulder are standard with shanks up to 1 1/2" by 1 1/2".



### Designed for Special Applications

We are repeatedly called upon to furnish special CHIP-HOG production tools. These examples from our engineering files combine CHIP-HOG standard construction and parts with special double-insert holders.

Write us, or call our representative for your copy of the CHIP-HOG folder and price list.

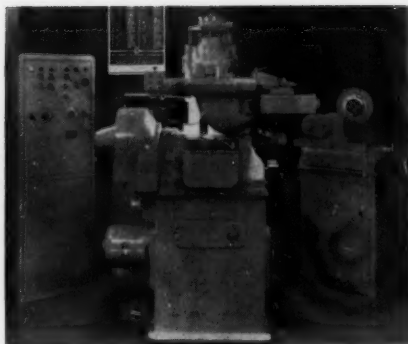
### THE GAIRING TOOL COMPANY

Tooling—Standard and Special

21235 Hoover Road, Detroit 32, Mich.

**new shop equipment . . .**

is inserted in the diamond dresser. According to the manufacturer, a complete setup can be accomplished in 60 minutes or less. The electrical system and its automatic controls are housed



**Belock Fully-Automatic Precision Gear Grinding Machine for spur and helical gears**

in a separate cabinet, and the operating cycles are programmed on the control console. All hydraulic, electrical and mechanical components are said to be placed so as to make servicing fast and simple. All electrical controls and circuits are housed in a separate control console.

The grinder also features a built-in wheel dresser. Automatic dress interval is set on the control console. At the end of the preset interval, the grinding wheel automatically positions itself for dressing and a light goes on to signal the operator, who merely sets the amount to be dressed on a dial and turns a lever to start the dressing operation. Root fillet radii are said to be ground as a continuous part of flank

# S H A R P

## NAMEPLATE MARKING



**Model No. 4**

The nameplate on your product is your signature. Keep it neat and legible! Accurate location and alignment are assured with this

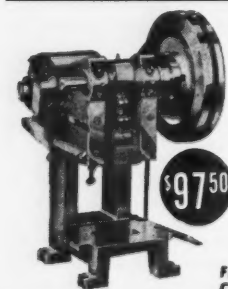
**NAMEPLATE DETAIL PRESS.**

- Simple Operation
- Perfect Alignment
- Uniform Depth



**GEO. T. SCHMIDT, INC.**  
 1806 W. BELLE PLAINE AVE.  
 CHICAGO • 13 • ILLINOIS

For more data circle 434 on Reader Service Card



**\$97.50**

## CUT COSTS with ALLEN Punch Press

### 2-Ton Power Bench Type . . Powerful, Dependable, Economical

For light work—stamping, forming, riveting—metal, fiber or other material.

Overall height 19 3/8" . . . Base size 9" x 8 1/4" . . . Die bed 6 1/4" x 8" . . . Ram face 1 1/2" x 3 1/2" . . . Ram stroke 3/4" . . . positive 3/4" ram adjustment . . . sturdy, single pin, non-repeat hand lever clutch . . . V-belt drive . . . weight 105 lbs.

The machine of a thousand uses! Adequate for many types of work now done on large presses at greater expense. Requires only 1/2 HP motor.

**30-DAY MONEY-BACK GUARANTEE.** Order TODAY. Price \$97.50 F.O.B., Clinton, Mo. (Includes Motor bracket, V-belt, motor pulley.)

Dealer Inquiry Invited

Free Circular

**ALVA F. ALLEN, Dept. MM, CLINTON, MO.**

For more data circle 435 on Reader Service Card

# New

## LEAD SCREW TAPPER

**Accuracy and Quality  
Beyond Comparison!**

This new lead screw tapper performs with miraculous accuracy . . . maintains uniform precision threads easily . . . all the time! And . . . with experienced or inexperienced operators . . . it makes no difference! Here's the secret: the tap is fed gently, easily, automatically without any pressure on the tap itself—it's completely controlled by the lead screw which guides the tap steadily, quickly, accurately—without variation—ever! Tests have shown it to produce parts with 100% inspection—100% acceptable parts—without rejects.

### Check these facts on this amazing unit!

- Consistently produces uniform threads in any pitch from 20 to 80!
- Finger tip "trigger arm" travels only  $\frac{1}{4}$ " on up or down stroke.
- Positive depth stop automatically disengages clutch at top and bottom of stroke without overrun; holds uniform depth to within .005".
- Tap capacity 0" to  $\frac{1}{4}$ " in soft material—0" to  $\frac{3}{16}$ " in steel.
- Entire lead screw assembly can be replaced in seconds for varying pitches.
- Lead screw travel 1- $\frac{3}{16}$ ". Will hold a class 3 fit with ease.
- Almost all parts spoilage completely eliminated; reduces fixture costs.
- Has famed Procunier cork faced friction clutch and exclusive tru-grip tap holder.
- Can be air operated for greater speed and convenience.

Write for **FREE Brochure** giving full details and specifications on this unique tapper. Illustrates the many outstanding features which make it a "must" for industrial users. Write today—now

## PROCUNIER Safety Chuck Co.

12 S. Clinton Street • Chicago 6, Illinois

DEPT. 5

For more data circle 436 on Reader Service Card

May, 1955

modern machine shop 235



New  
"Tru-Grip"  
Tap Holder

is lighter, smaller in diameter. It affords easier tapping close to walls or shoulders, eliminates "chewed" tap shanks.

## new shop equipment . . .

grinding. The machine has a capacity of from  $\frac{3}{4}$  to  $7\frac{1}{2}$ -inch pitch diameter and will handle 4 to 32 pitch. The tooth form is generated with a single grinding wheel on which multiple annular rack gear forms have been dressed. These gear forms are in varying diameters so that in one pass of

the work table several teeth are generated progressively in rough, semi-finished and finished form.

For more data circle 77 on Reader Service Card

★ ★ ★

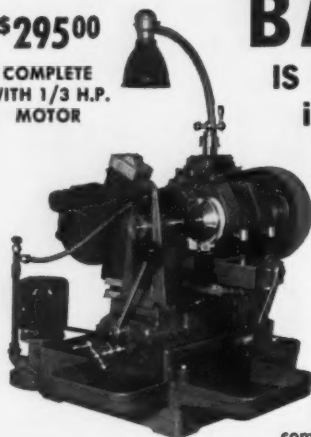
## TORQUE CONTROL COUPLING

A compensated torque control coupling of the friction disc type, designated

as the RLH Series, which delivers its torque setting accurately has been announced by Buffalo Machinery Co., Inc., 833-841 Grant St., Buffalo 13, N. Y. The coupling is said to automatically adjust the normal force between friction surface in inverse proportion to the variation in coefficient of friction. First, the torque compensation unit

**\$295.00**

COMPLETE  
WITH  $\frac{1}{3}$  H.P.  
MOTOR



## BARKER IS YOUR BEST BUY in a BENCH MILL

Just

- ✓ Check the price
- ✓ Check the "specs"

Special Accessories on model shown here available at slight extra cost.

Hundreds of Barker mills in operation and not one complaint. It's a pretty strong statement, but true.

Every BARKER is precisely and sturdily built. A "work horse" on any bench.

Today, BARKER MILLS are performing various machining operations in hundreds of diversified industries, large and small.

Rather than attempt to tell all here, we'd like to mail you the "BARKER" story with complete information on specifications, operational features, special accessories and the list of many users, many doubtless in your particular field.

WRITE TODAY FOR LITERATURE

**BARKER ENGINEERING COMPANY**  
500 GREEN ROAD CLEVELAND 21, OHIO

### A FEW OF THOUSANDS OF CUSTOMERS

General Motors  
Ford Motor Co.  
Chrysler  
Fairchild Aircraft Corp.  
Western Electric Co.  
Lincoln Electric  
Remington Rand, Inc.  
Thompson Products, Inc.  
Bausch & Lomb Optical Co.  
Bulova Watch Co.  
A. B. Dick Co.  
American Phenolic Corp.  
J. I. Case Co.  
New Departure  
Fisher Body  
Westinghouse Electric Corp.

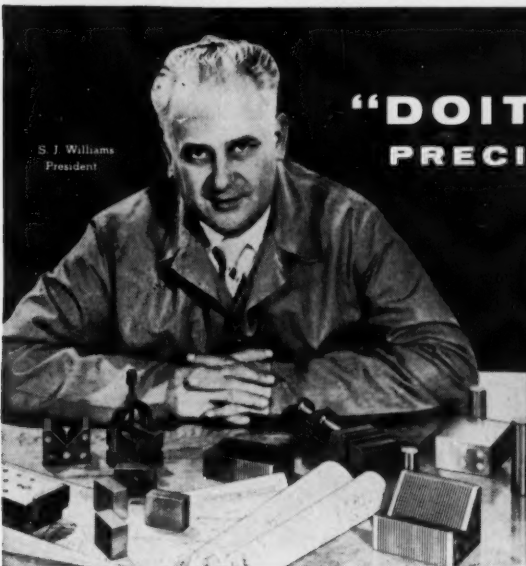


Buffalo RLH Series  
Compensated Torque  
Control Coupling

For more data circle 437 on Reader Service Card



TOOLMAKERS..MACHINISTS..APPRENTICES..STUDENTS..MANUFACTURERS..MACHINE SHOPS



S. J. Williams  
President

## NEW "DOIT" URSLF PRECISION TOOLS

*Slash the cost of  
toolmaker's tools!*

and make possible  
greater earnings  
for metal workers ...  
greater savings  
for the companies  
that employ them!

### **do better work! get better pay!**

Could you do better work if you owned better tools? Of course you could! You'd get better pay! That's why "DOIT" URSLF is so important! Up to now you may not have felt you could afford to buy such tools as these. But "DOIT" URSLF, a remarkable new approach to the manufacture of toolmaker's tools, cuts costs to the bone ... allows you to own the very finest tools for pennies where otherwise you'd have spent dollars.

The "reason why" that makes these tremendous savings possible is simple:

**"DOIT" URSLF furnishes all materials!**

**"DOIT" URSLF gives you complete  
drawings and instructions!**

**YOU do all the finishing and assembly!**

### **cut costs! cut labor! cut "down" time!**

The cost-conscious machine shop or manufacturer will find hundreds of special applications for "DOIT" URSLF tools that will save time and money and add to the flexibility of expensive machinery.

The variety of magnetic tools, alone, offered by "DOIT" URSLF, will be impressive.

Assembling and finishing any "DOIT" URSLF tool is simple—even for a student or apprentice.



Distributors ... Mill Supply Houses ... Manufacturers'  
Representatives ... Inquiries Invited!

**S. J. WILLIAMS**

Precision Tool Kits, Inc.

makers of "DOIT" URSLF Precision Tools  
4448 Soo Line Lane • Schiller Park, Ill.  
PHONE — Gladstone 5-5200

### **WRITE FOR A FREE CATALOG TODAY!**

Mail this coupon! You may paste it  
on a postcard if you wish!

**S. J. WILLIAMS Precision Tool Kits, Inc.**  
4448 Soo Line Lane • Schiller Park, Ill.

NAME

ADDRESS

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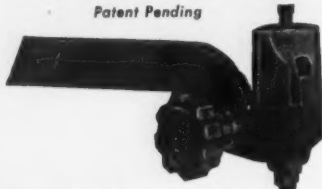
For more data circle 438 on Reader Service Card

**new shop equipment . . .**

is adjusted to any predetermined torque using a standard Allen wrench and then is checked with a standard torque wrench. Thereafter, the friction plates are controlled automatically to supply an equal and opposite slip

**Monarch Precision  
SHAPLANE  
Radius Tools**

*Patent Pending*



**Five Models for**

**LATHES, SHAPERS, PLANERS,  
AND BORING MILLS.**

**RANGE 1/2" TO 3" RADIUS (MODELS ALSO  
AVAILABLE FOR CONVEX CUTTING, AND  
CONCAVE RADIUS TO 6" ON PLANERS, ETC.)**

**C. B. TEETER  
Tool Room Specialties**

**4470 Oakenwald Ave., Chicago 15, Ill.  
Phone Drexel 3-3571**

For more data circle 439 on Reader Service Card

torque. According to the manufacturer, accuracy of control is within 5 per cent throughout the entire range of coupling operation. The unit may be designed into special tools or directly applied as spindle or transmission type torque limiting couplings.

The transmission type is furnished with an automatic tripper unit which actuates a limit switch that cuts off the power immediately when an overload occurs. The unit is available in five basic models from 5 to 1,500 inch-pounds torque capacity. Body diameters range from 3 1/8 to 6 1/2 inches, and overall length and weight vary with input and output shanks. The unit is torque limiting in one direction and solid drive in the other. Left-hand or right-hand operation can be supplied.

For more data circle 78 on Reader Service Card

★ ★ ★

**MACHINE GRINDS AND  
RECONDITIONS SMALL TOOLS  
AND CUTTERS**

Identified as the No. 1, a cutter and tool grinder which is designed primarily for grinding and reconditioning miscellaneous small tools and cutters has been announced by The Cincinnati Milling Machine Co., Cincinnati 9, Ohio. The machine has a capacity of 8-inch swing and 15 inches between



**Air-O-chek  
GUN**

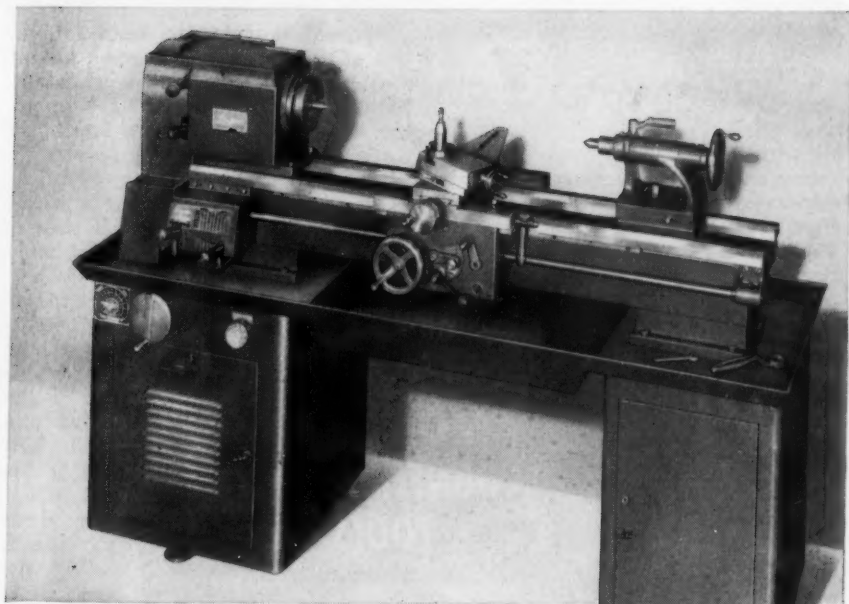
**COMPRESSED AIR  
ECONOMY**

In machine shop and foundry clear away chips, dust, dirt and surplus material quickly . . . AND SAVE through low initial cost, superior performance, low maintenance. Air-O-chek air guns are of simple design, sturdy construction and are easy to use.

**Write for full details**

**AIR-WAY PUMP & EQUIPMENT CO.  
1046 N. Kilbourn Ave. Chicago 51, Ill.**

For more data circle 440 on Reader Service Card



**THIS NEW 14" *Logan* LATHE**  
**PERFORMS...**  
**AND THE RESULTS PROVE ITS SUPERIORITY**

The more jobs you watch this rugged new Logan "6560" perform, the more impressive it looks. On the heaviest cuts, or at maximum speed, it turns the work *smoothly*, quietly, with precision results. Superior performance is designed, engineered and built into it.

The Variable Speed Drive provides instant spindle speed correction. The oversize spindle, with 1½" bore, turns on a ball bearing mounting that needs no adjustment within the full range of 38 to 1200

rpm. The bed is a wide, deep special alloy casting, extra heavy and resistant to both internal and external stresses. The two V-ways and two flat ways are precision ground. Extra strength and weight throughout, plus dynamic balancing of the complete lathe practically eliminates vibration. Moderate price and low cost operation make the "6560" outstanding in economy as well as in precision performance. Write for Bulletin 14-L, giving a full description.

**SPECIFICATIONS AND FEATURES**

14½" swing over bed  
 9" swing over saddle  
 1½" spindle hole  
 1" collet capacity  
 40" between centers

Variable Speed Drive  
 Ball Bearing Spindle  
 38 to 1200 rpm  
 Two-V-way, Two-flat  
 way, Precision  
 Ground Bed  
 Precision Carriage

LOOK TO LOGAN FOR BETTER LATHES AND SHAPERS

**LOGAN ENGINEERING CO.**

Lawrence and Lamon Ave., Chicago 30, Ill.

For more data circle 441 on Reader Service Card

May, 1955

modern machine shop 239

## **new shop equipment . . .**

centers. The unit has the cartridge-type grinding wheel spindle mounting with a double row of special pre-loaded anti-friction bearings. The cartridge-type unit may be readily replaced after years of service, thus restoring new spindle performance into the machine quickly and easily. A rever-

sible  $\frac{1}{2}$ -h.p. motor drive, built into the wheelhead, provides the desired direction of grinding wheel rotation to suit any particular grinding application. Spindle speeds, 6,260 or 3,730 r.p.m., are easily obtained from a tooth-grip drive belt and sheave arrangement.

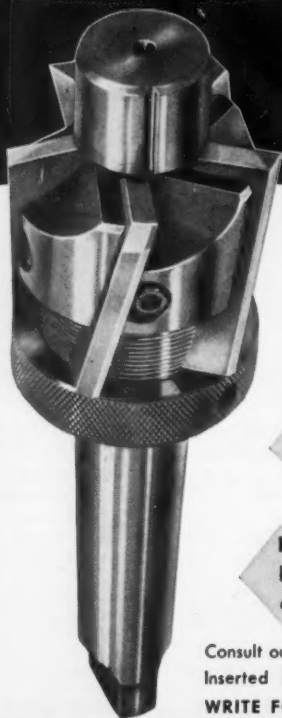
Grinding wheel collets may be quickly interchanged by removing a socket head screw. Anti-friction table slide is said to provide unusual ease of table movement, and duplicate controls give

the operator a choice of operating the machine at the front, right-hand end of the table or at the rear, right or left-hand side of the wheelhead. Curtain-type dust guards beneath each end of the table movement operating controls from abrasive dust.

According to the manufacturer, an interesting innovation is the 360-degree eccentric wheelhead swivel which adds 3 inches to the conventional cross range of  $4\frac{1}{2}$  inches, facilitating surface grinding operations and assuring ample capacity for grinding large diameter cutters requiring the full 8-inch swing of the machine. Another design feature is a swivel table "Tange Bar" tap-

## **INSERTED BLADE GENESEE**

### **FACING AND COUNTERBORING TOOLS**



**Interchangeable Pilots**

**Constant Chip Space  
Throughout Life of Blades**

**Standard Sizes  $1\frac{1}{4}$  to 4  
Standard with Straight or  
Morse Taper Shanks**

**H. S. S.—Carbide Tipped  
Blades. Save 25% or more  
over cost of Solid Tools**

Consult our Engineering Department on your  
Inserted Blade Production Tool Problems.  
**WRITE FOR CATALOG 54M**

## **GENESEE MANUFACTURING COMPANY**

566 HOLLENBECK ST. • ROCHESTER 21, N. Y.

Adjustable Hollow Mills • Facing and Counterboring Tools • Special Production Tools • Since 1908

For more data circle 442 on Reader Service Card

# NEW!

# Speedy



## 1 TON *Heavy Duty* AIR PRESS

No. 80

only \$85

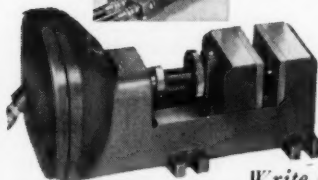
This useful, high quality AIR PRESS is the last word in air power engineering—the result of 34 years of specialization in diaphragm compression. Extremely sturdy, it does dozens of jobs formerly handled by expensive presses—and does them more quickly, easily and economically. Operated by Speedy Foot Control, Hand, or Fingertip Valves. Order from your mill supply house or write direct.

- ★ Heavy grey iron casting, machined surfaces.
- ★ Power factor—15 times air line pressure of 5 to 150 lbs.
- ★ Throat clearance to center of 10" diam. circle.
- ★ Ram clearance 0 to 5", stroke  $\frac{7}{8}$ ", table 5" x 5".



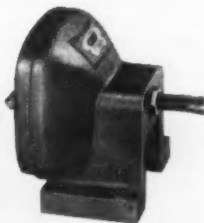
### ◀ SPEEDY AIR VISE No. 60

New improved design. Jaws open to 3". 15 times air line pressure. Complete with Foot Control Valve, Air Hose and Fittings. \$44.00



### SPEEDY AIR RAM No. 70 ▶

Mounts in any position. Compact, extremely sturdy. Exerts gentle pressure to one ton thrust. 6½" high, 5¾" wide. \$35.00



Write For New Complete Catalog

**W. R. BROWN CORP., 2649 N. NORMANDY AVE., CHICAGO 35, ILL.**

AIR REGULATORS • AIR VALVES • AIR FILTERS • PAINT SPRAYERS • AIR COMPRESSORS

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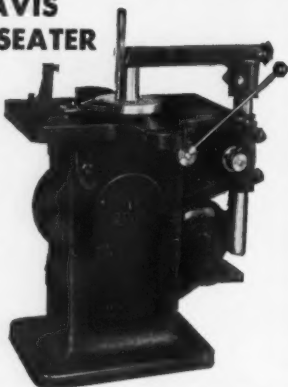
**new shop equipment . . .**

er setting device. Utilizing precision gage blocks, the taper setting device is said to enable the operator to quickly position the swivel table and obtain a higher degree of accuracy. The double-end anti-friction spindle of the universal workhead is designed to accommo-

**Why Use A Shaper  
to cut Keyways when a  
DAVIS  
KEYSEATER**

will  
do the  
job so  
much  
quicker  
and  
better?

Send  
for  
Circular



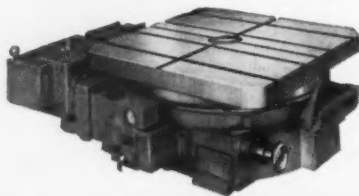
**DAVIS KEYSEATER CO.**  
Exchange and Glasgow Sts.  
ROCHESTER, N. Y.

For more data circle 444 on Reader Service Card



*Cincinnati No. 1 Cutter and Tool Grinder*

date No. 12 B & S (No. 5 Morse optional) taper shanks on one end and No. 50 Series National Standard on the other end. Clearance setting dials on both the workhead and left-hand tailstock permit setting for predetermined clearance angles. Electrical controls are built-in, neatly recessed in a compartment at the front of the machine. A wide variety of attachments for extending the range of the machine for



**FASTER set-ups and positioning**

You save set-up and positioning time with Gilbert rotary tables. *Hand-indexing:* 36" and 50" square or round. *Power rotary and power feed:* 36", 50", 60", and 72" square or round. Special tables built to your requirements. For complete descriptions and specifications, write for *Bulletin 854*.

THE CINCINNATI **GILBERT** MACHINE TOOL COMPANY • CINCINNATI 23, OHIO

For more data circle 445 on Reader Service Card

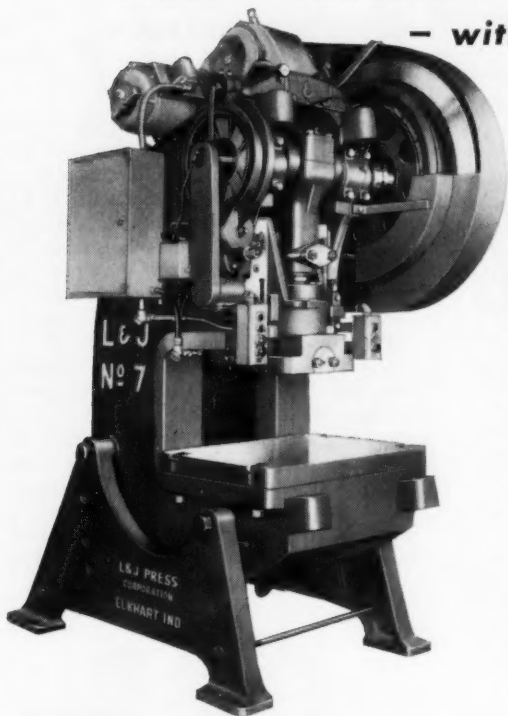


# NEW L&J NO. 7 PRESS

**RIGID — ACCURATE — EFFICIENT**

**— with a LARGER**

**WORK AREA**



This new press will give you greater production at lower cost. Its alloy iron frame has exceptional rigidity which holds deflection to a minimum and gives closer tolerances, greater uniformity and longer die life. Accuracy is also obtained through adjustable gibs of extra length. The rugged ram adjusting screw has buttress threads and replaceable hard bronze seat. Air clutch optional. Geared and non-geared models.

**Specifications:** capacity 75 tons, standard stroke 4", strokes per minute 42 (non-geared 85), die space 14" to 22".

**Booth 407 — The Machine Tool Show  
International Amphitheatre — Chicago**

**Write for Catalog**  
**21 O.B.I. models — 8 to 90 tons**

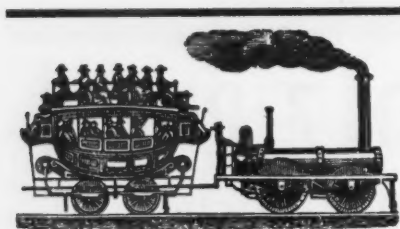


**L&J PRESS CORPORATION**  
**1624 STERLING AVE., ELKHART, INDIANA**

For more data circle 446 on Reader Service Card

May, 1955

modern machine shop 243



## The Past...



The slow steps of the past are gone . . . for the present, the future, get better production and finer finishes with Whitton Precision Spindles.

Equip your new Surface Grinders with Whitton Spindles . . . for easy adaptability and for modernizing your old machines.

These rugged Spindles are for today, tomorrow . . . and for high production. They're made to last long . . . powerful springs prevent chatter regardless of wear or temperature changes, and the sealed-in lubrication requires no attention. Whitton Spindles assure micro-finishes . . . the Spindle assembly is precision balanced on its own bearings, which are the most accurate obtainable.

The present, the Future, and Whitton Spindles . . . all teamed for you.



For more data circle 447 on Reader Service Card

244 modern machine shop

## new shop equipment . . .

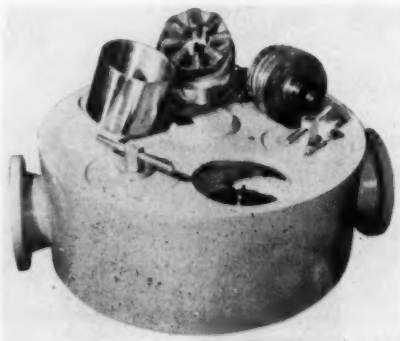
sharpening miscellaneous small cutters, including those of sintered carbide, are available.

For more data circle 79 on Reader Service Card

★ ★ ★

## MAGNETIC SEPARATOR IS DESIGNED FOR HEAVY-DUTY OPERATIONS

For the magnetic filtration of lubricating oil in heavy machinery, such as steel mill equipment, S. G. Frantz Co., Inc., P.O. Box 1138, Trenton 6, N. J., has announced the Model 6-PA-6 "Ferrofilter" Magnetic Separator which contains, in one shell, six permanent magnet separator assemblies. Each assembly comprises a stack of 13 grids graded as to openings, strongly magnetized by a pair of Alnico permanent magnets. The grids are of honeycomb design and split the oil into thin streams, forcing vagrant particles of steel, iron, rust and scale to pass close to thousands of feet of strongly magnetized grid edges. Here the strongly convergent magnetic fields are claimed to create intense forces on even the



Frantz Model 6-PA-6 "Ferrofilter" Magnetic Separator for filtering lubricating oil

May, 1955

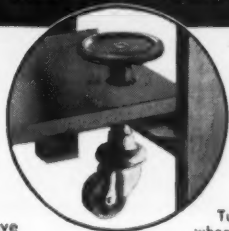
*It's New! It's Portable!*



**Challenge®**

**CAST-IRON TOP  
WORK BENCH**

WITH "ROLLER-CONTROL" ACTION!



Turn  
wheel-jack  
to lift  
weight off legs  
onto roller.

Bring the Bench to the work instead of bringing the work to and from the Bench. Save hours a day! Sizes 28 x 48, 28 x 60, 28 x 72, 28 x 84. 2" Top with lock-leveling screws, full bottom shelf. Pilfer proof steel drawer optional.

**ANOTHER ADDITION  
TO THE CHALLENGE LINE OF TOP  
QUALITY WORK BENCHES**

Choose from 16 popular models, available with 4 or 6 legs, with or without shelf or drawer. Get the "quiet-efficiency" of Challenge design.

1. "Front-to-back" production line efficiency.
2. Natural, left-hand lighting.
3. Wear-resistant, 2" cast-iron top.
4. Ample storage facilities.
5. Vise easily attached.



Write for details to

**THE CHALLENGE MACHINERY CO.**



TRADE-MARK ®

789

Office, Factories and Show Room:  
GRAND HAVEN, MICHIGAN

For more data circle 440 on Reader Service Card

May, 1955

modern machine shop 245

## new shop equipment . . .

finest magnetic particles, attracting them to the grids and holding them until the filter is cleaned.

The Model 6-PA-6 is made with 8-inch flanged inlet and outlet pipe connection and has a rated capacity of 450 g.p.m. for oil of 2500 S.S.U. viscosity. For oils of lower viscosity, its capacity ranges up to 1200 g.p.m. Be-

cause the grids offer little resistance to the flow, the pressure drop is said to be held to 2.5 pounds per square inch. For more data circle 80 on Reader Service Card

★ ★ ★

## IMPROVED RUBBERIZED ABRASIVE CONE HAS THREADED STEEL BUSHING

To provide greater convenience, instant and easy operation, Cratex Mfg.

Co., 81 Natoma St., San Francisco 5, Calif., has announced that its abrasive cones are now being manufactured with threaded steel bushings inserted therein. The threaded steel bushing, inserted in and bonded to the rubberized abrasive cone, is said to provide a tight union fit, running straight and true. Accord-

**PRECISION**

# Machine Tool Attachments

with endless versatile variations

**TRAVERSE SLIDES FEEDS TABLES  
SPINDLES—MOTORIZED OR BELT DRIVE  
FOR WORK HEAD OR GRINDING WHEEL**

**DO IT YOURSELF!**

- Select a **STANDARD Precision Spindle** and/or **Work Head . . .**
- Assemble with **STANDARD Feeds or Traverse . . .**
- To convert your old machine tool . . .
- To design your own assembly or machine tool . . .
- To incorporate in a special machine you wish **STANDARD** to build for you





360° Swivel



8"x21" Precision (Tilting) Table



Compound Feed



Special Mounting Base



Graduated Swivel Base



Hydraulic Anti-Friction (Ball Bushing) Traverse



Precision Spindles No. 6000 Series



Work Head or Grinding Spindles

Catalog on Request

*Standardize with*

## the STANDARD electrical tool co.

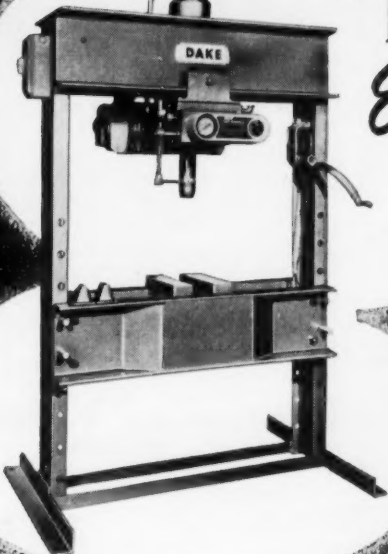
**MACHINE TOOLS**

2487 RIVER ROAD • CINCINNATI 4 • OHIO

For more data circle 449 on Reader Service Card



**Cratex Improved Rubberized Abrasive Cone with threaded steel bushing feature**



*New!*

# DAKE

## Elec-draulic

### PRESS

▶ OPERATES  
EASIER, FASTER

▶ COSTS  
LESS

Here is a completely new electric-hydraulic forcing and straightening press, with construction and operating advantages never before offered in a low-cost shop press.

**These are a few of the features :**



**Rapid Ram Approach**

Automatically changes to power stroke when it contacts the work.



**Movable Workhead**

Self-contained—easy to center over the work. Workhead can be purchased separately.



**Variable Ram Speed**

From zero to maximum under fingertip control.



**Modern Design**

All operating controls at convenient working height.

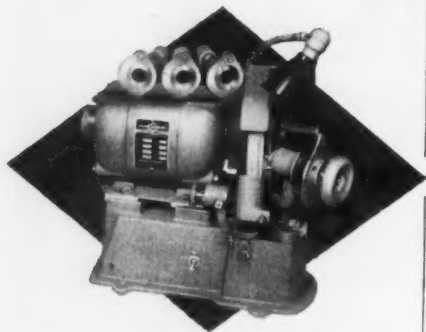


These and dozens of other features are fully described and illustrated in new Bulletin No. 347, which we will send promptly on request.

**Dake Corporation** • 612 Seventh St., Grand Haven, Mich.

For more data circle 450 on Reader Service Card

# STOP WASTING DRILLS!



*Accurate Grinding  
reduces breakage,  
prolongs drill life!*

## FREE BOOKLET . . .

shows how to prevent excessive drill breakage, vastly prolong drill life . . . and eliminate time wasted by valuable skilled mechanics grinding drills!

Black Diamond's "Positive Positioning" feature positions drill to exact twist you want . . . automatically. Now anyone can sharpen and web-thin with scientific accuracy . . . on a Black Diamond Drill Grinder! **WRITE TODAY!**

## BLACK DIAMOND

Saw &  
Machine Works

Natick, Mass.

71 North Ave.

For more data circle 451 on Reader Service Card

248 modern machine shop

## new shop equipment . . .

ing to the manufacturer, the cone cannot be pulled loose, twisted or turned once in position. The bushing is said to provide greater convenience in making replacements and greater ease and flexibility in use.

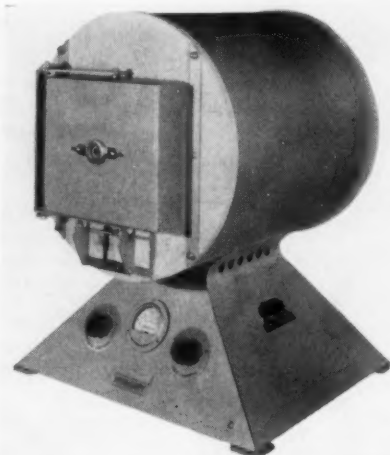
The improved cone with the threaded steel bushing is available in two sizes; namely, the No. 1358, which is 1 3/4 inches long x 15/16 inch in diameter, and the No. 1359, which is 1 1/4 inches long x 7/8 inch in diameter. Each size is designed to fit a 1/4-inch diameter mandrel and can be supplied in four grit textures — coarse, medium, fine and extra fine.

For more data circle 81 on Reader Service Card



## MUFFLE FURNACE IS COMPACT, SELF-CONTAINED UNIT

Identified as the Alloy 10, a muffle furnace which is a complete, self-con-



Hevi Duty Alloy 10 Muffle Type Furnace

May, 1955



# Webber Introduces a NEW "THIN BLOCK" Gage Set



## Prices of Individual Blocks

	Type "A"	Type "B"
.010 . . . . .	\$15.00	\$12.50
.02005 . . . . .	13.00	10.50
.020 wear . . . . .	13.00	10.50
.020 . . . . .	13.00	10.50
.0201 through .0209 . . . . .	13.00	10.50
.021 through .029 . . . . .	13.00	10.50
.030, .040 . . . . .	13.00	10.50
.050, .060 . . . . .	7.70	4.68
.070, .080, .090 . . . . .	7.15	4.40

An indispensable set of gage blocks for the precision manufacturer whose present set of blocks does not provide for measurement under .100".

Available in steel, either in full 30 block sets or individually.

## Price, complete with case

Set No. 30A ( $\pm .000004$ ) \$305.00

Set No. 30B ( $\pm .000008$ ) \$235.00

# Webber GAGE COMPANY



12899 Triskett Road • Cleveland 11, Ohio

Largest Exclusive Manufacturers of Precision Gage Blocks

For more data circle 452 on Reader Service Card

## **new shop equipment . . .**

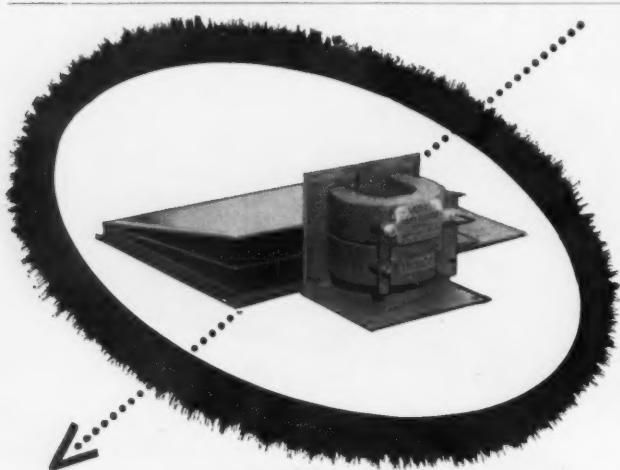
tained, compact unit designed for high efficiency and long life has been announced by Hevi Duty Electric Co., Milwaukee 1, Wis. The safe working temperature of the furnace is said to be 2,300 deg. F. According to the manufacturer, the furnace may be operated at a maximum temperature

of 2,350 deg. F. for intermittent periods of comparatively short duration. The unit consists of a furnace and furnace base containing all controls and instruments necessary for operation.

The steel furnace shell is lined with insulating brick of low heat conductivity. Asbestos ends fit snugly against the insulation for further efficiency. The pyramid-type furnace base contains the temperature control assembly, indicating pyrometer calibrated in degrees

Fahrenheit and degrees Centigrade, tap-changing transformer, switches and terminal board, all mounted on a drawer-like frame which slides out of the base.

The formed elements are made from a special alloy wire. These elements, it is claimed, permit continuous operation at 2,300 deg. F. without endangering the long service life of the furnace directly on line voltage. Accordingly, the transformer provides the necessary low operating voltage which limits the operation of the furnace to alternating current only. The furnace is equipped with a sturdy, tight fitting, side hinged door with a center pivot so that



## **THIS SIMPLE MAGNETIC DEVICE speeds up sheet steel handling**

"Costs only a few dollars but it's worth a million." That's what users say about the Verson Sheet Floater—a simple, magnetic device that quickly and economically separates stacked steel sheets and blanks for feeding to presses, brakes and shears. The Sheet Floater is available in 3 models of 10 sizes each plus a Special Heavy Duty Adjustable Model. Can be used for rectangular, round and most odd shaped pieces. Send for free bulletin.



9310 S. Kenwood Ave., Chicago 19, Ill.

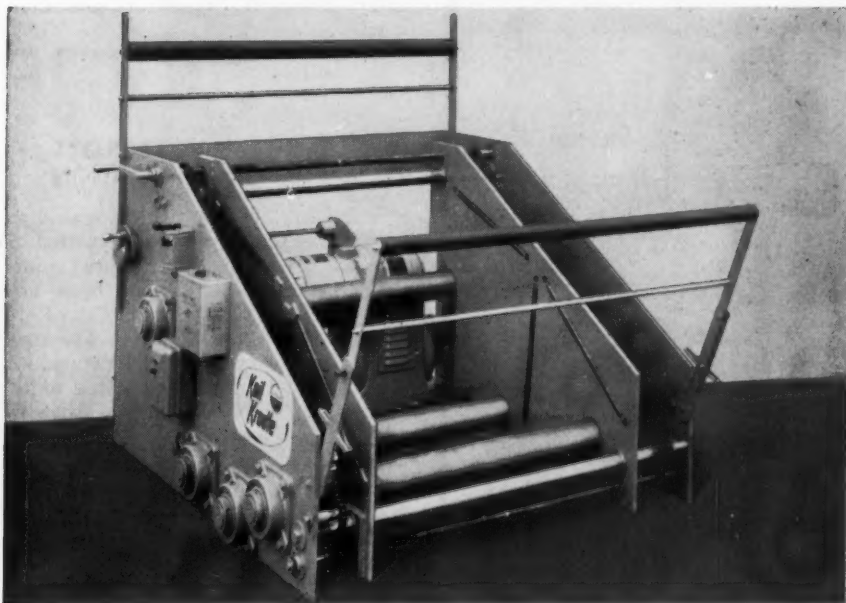
**VERSON ALLSTEEL  
PRESS CO.**

So. Lamar at Ledbetter Dr., Dallas, Tex.

For more data circle 453 on Reader Service Card

## NEW 7000 lb. *Koil-Kradle*

feeds 40" stock from 42" rolls



**benchmaster** now supplies all KOIL-KRADLE requirements, standard or special, from 1/2 ton to 8 tons capacity.

**OPERATES INTERMITTENTLY** using Vari-loop Control to sustain a slack loop from which any machine can draw.

**DUAL GUIDE PLATES** quickly adjust for any stock width up to 40".

**OPERATES CONTINUOUSLY** at any constant speed within range of variable-speed driving unit.

**ALL ROLLS HARDENED.** Power driven rolls mounted in self-aligning bearings.

*There's only one KOIL KRADLE! Write for quotations on your coil-feeding requirements.*

1835 West Rosecrans Avenue  
Gardena, California

**benchmaster**

World's largest  
manufacturer of small punch  
presses and mills.

For more data circle 454 on Reader Service Card

## SAVE HOURS CUT HEAT TREATING COSTS



**Quick Acting  
Johnson No. 142  
Hi-Speed  
Furnace**

Save time, save gas . . . heat treat carbon and high speed steels, dies and tools with the JOHNSON 142. Powerful burners provide fast uniform heat with time saving speed. Gets the job done while other furnaces are still warming up. Temperatures easily regulated with accuracy. Door opens upwards allowing tools to be inserted or withdrawn without fully opening door. Firebox 7" x 13" x 16 1/2" lined with high temperature refractory. Complete with Carbofrax Hearth, G. E. Motor and Johnson Blower.

For temperature range 1300° to  
2350° F. . . . . \$325.00 F.O.B. Factory

Models available in smaller firebox sizes.

**Write for Free Catalog**

**JOHNSON GAS APPLIANCE CO.**

571 E Ave. N.W., Cedar Rapids, Iowa

Since  
1901

**JOHNSON  
FURNACES FOR INDUSTRY**

For more data circle 455 on Reader Service Card

252 modern machine shop

## new shop equipment . . .

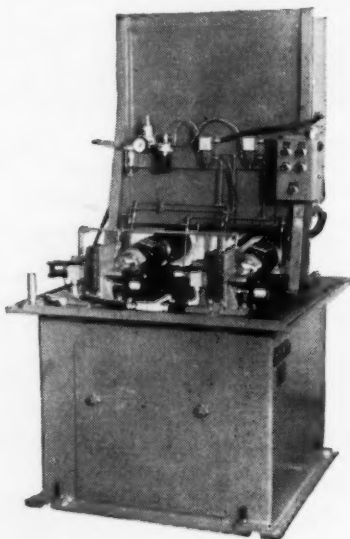
when opened, the hot side is facing away from the operator providing maximum safety.

For more data circle 82 on Reader Service Card

★ ★ ★

## DRILLING MACHINE EMPLOYS PRINCIPLES OF AUTOMATION

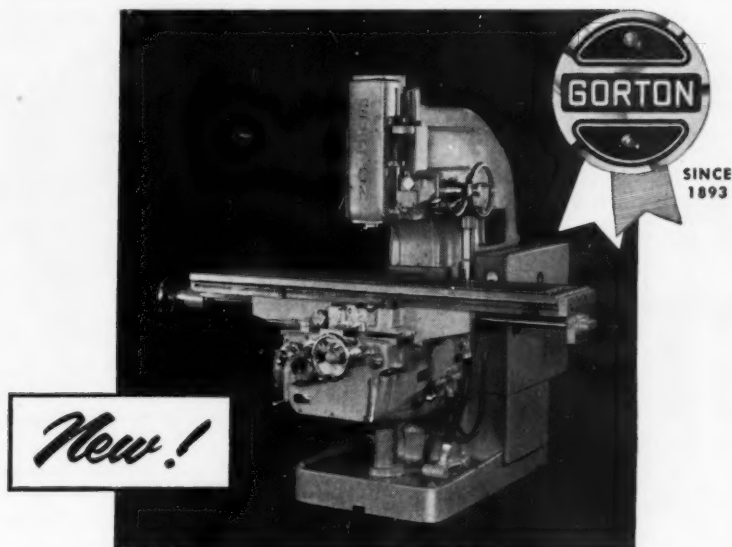
A drilling machine which is said to employ the principles of automation to increase the production rate and minimize production costs has been announced by Govro-Nelson Co., 1933 Antoinette, Detroit 8, Mich. The machine incorporates two independent Govro-Nelson automatic drilling units, each being completely interlocked with an air-operated magazine which is kept filled by the operator or mechani-



**Govro-Nelson Drilling Machine which is designed to employ principles of automation**

May, 1955

## GORTON PRESENTS A *Winner!*



NEW GORTON 3-48 VERTICAL MILL

### Check Your Requirements and These Features

1. 76" table with 48" table travel.
2. Extended saddle with hardened inserts.
3. Fullwidth knee with 24½" bearing spread.
4. Square lock bearing guides.
5. 10 H. P. Spindle motor — drives spindle only.
6. 36 spindle speeds from 25 to 2,000 R. P. M.
7. 3 H.P. motor for table, saddle and knee.
8. Mechanical and electrical overload protection.
9. Interchangeable Assembly Unit Construction.
10. Removable coolant pan for easy clean-out.
11. Dial-type Horse Power load meter.
12. Spindle drive gear designed to reduce wear.

Write for Complete  
Catalog 1655-1705.



GEORGE **GORTON** MACHINE CO.

1705 RACINE STREET \* RACINE, WISCONSIN

SINCE 1893

Tracer-Controlled Pantographs, Duplicators—standard and special... Horizontal and Vertical Mills, Swiss-Type Screw Machines, Tool Grinders, Small Tools and Accessories.

For more data circle 456 on Reader Service Card

A8196-1P-A

May, 1955

modern machine shop 253

## new shop equipment . . .

cally. According to the manufacturer, the machine drills a 0.135-inch hole in a brass part at the rate of 40 pieces per minute.

The parts are automatically clamped, drilled and ejected into a chute, permitting complete automation. It is

claimed that by making minor changes, the machine can readily be adapted to a variety of drilling operations.

For more data circle 83 on Reader Service Card

★ ★ ★

## LATHE INCORPORATES SPEED PRESELECTION MECHANISM

The incorporation of a speed preselection mechanism in the Dyna-Shift

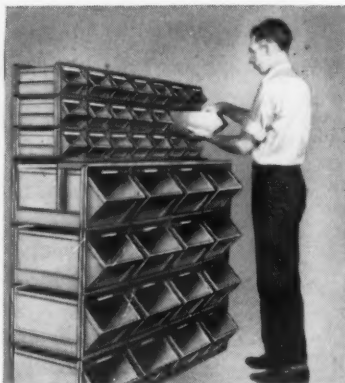
type of headstock is the main feature of the Series 62 Lathe developed by The Monarch Machine Tool Co., Sidney, Ohio. According to the manufacturer, the preselection feature of the machine permits increasing or decreasing the speed at will as operations progress; however, once the diameter preselectors have been set for a given workpiece, as many of these pieces can be turned as desired without further thought being given by the operator to the speeds to be used.

The controls of the Preselector Dyna-Shift have been incorporated in the front of the headstock. They consist of a large surface speed setting dial, a large work diameter setting dial, a

# STOP

excess  
handling of  
tools, parts,  
materials!

Stackbin®-Stackrack® Combinations are the ideal way to minimize parts, tools, materials handling. Stackbins are portable containers, so you can carry materials throughout your process without transferring contents to any other container. Stored in Stackracks, every Stackbin is instantly accessible when it's needed. You never disturb another bin. Hopper fronts on Stackbins provide visibility and accessibility to the materials. Available in 7 sizes, Stackbin-Stackrack Combinations make most efficient use of floor space. With inexpensive Adapters any small units can be stacked on larger units. Related items can be kept in one place. Individual units lock together; no tools, no setup time needed.



For full information  
write to STACKBIN CORP.,  
1083 Main St., Pawtucket, R. I.

BOOTH No. 1133  
NAT'L. MATERIALS HANDLING  
SHOW  
CHICAGO

Mfgd. and sold in Canada exclusively by Wickware-Stackbin, Ltd., Ottawa

**STACKBIN**

"Stacked and



**SYSTEM**

Still Accessible"

For more data circle 457 on Reader Service Card

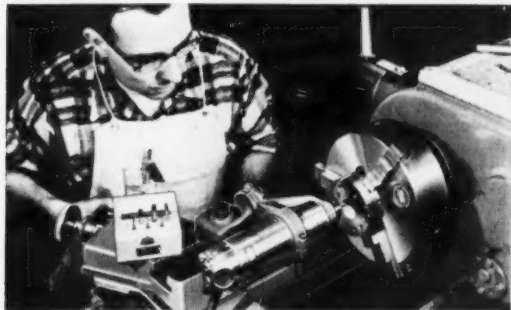


# Precise POWER QUILLS

**UP TO 45,000 R. P. M.  
AND 1/2 H.P. ON AC/DC  
FOR TOOLROOM AND PRODUCTION**

For speed with power with precision at real savings, mount PRECISE POWER QUILLS on lathes, milling machines, surface grinders—virtually *any* available single-purpose machine tool. In such applications as internal and external grinding or for micro-milling, precision straight milling, slotting, small diameter drilling, finishing and polishing, one PRECISE POWER QUILL with PRECISE MACHINE MOUNT can frequently do the work of a machine costing up to 100 times as much! Fine finishes to tolerances as close as .0001" are obtained with carbide micro-mills or high-speed grinding wheels in less time and at lower cost on materials as soft as plastics, as brittle as glass or as hard as the hardest alloy steel. A complete line of Mounts, Speed Controls, Accessories and Rotary Tools provide *unlimited versatility*.

**CONDENSED SPECIFICATIONS:** Choice of 1/4 or 1/2 H.P. Models in precision-ground steel housings. Air-cooled AC/DC motors, protected against overloads by replaceable Fusetrons; heavy-duty, direct-drive quill rides on four over-sized, sealed, micro-precision bearings. Ground and honed collet chuck uses collets in a range between .090" to .250".



Micro-milling hard steel die. PRECISE SUPER 50 removes as much as .005" in one pass leaving surface finishes under 10 micro-inches and producing a straight, round hole to .0001".



**Call Your Industrial Distributor  
or Write for New Catalog  
Just Off the Press**

**PRECISE PRODUCTS CORPORATION, 1345 CLARK ST., RACINE, WIS.**

For more data circle 458 on Reader Service Card

## new shop equipment . . .

set of diameter preselectors, a large spindle r.p.m. indicator dial and a knob which frees the spindle from the gear train. With these controls, all that an operator has to do is to set the dials for work diameter and surface feet per minute required, and the Dyna-Shift computes the r.p.m. and makes the shift automatically and

hydraulically to give the correct spindle speed at which to operate. The surface speed may then be maintained on succeeding diameters of the work by setting up the values of the latter on the numbered, adjustable work diameter selectors provided with the Preselector control. Every speed change thereafter, on every piece in the run, is said to take place automatically with but one fast dial setting and movement of the work start and stop lever. The work start and stop lever is located at the

apron operating position. For set-up purposes, there is a second work start and stop lever at the headstock end of the machine. These levers have three positions; namely, run, brake and jog. There is claimed to be finger-tip shifting from one position to another because clutching, braking and jogging are done hydraulically, with the levers simply opening valves.

With the Dyna-Shift headstock, the operator never needs to convert r.p.m. to f.p.m., nor need he bother what r.p.m. he is using although a large indicator dial is provided to show at a glance the spindle speed being used. For added convenience, particularly when



Cutting costs in these times is a good trick if you can do it. You can, on plates requiring detail marking, by using an Automark Electric Metal-Marking Typewriter. The operator lightly touches the key and the Automark does the rest, quickly and automatically. No dial to turn—no lever to pull. Marking output is increased five times and worker fatigue is greatly reduced. Write today for Bulletin 8-16.

## **AUTOMARK** **Electric Metal-Marking** **TYPEWRITER**

Manufactured Exclusively By

**DEFIANCE MACHINE & TOOL COMPANY**

1924 South Vandeventer Ave. • St. Louis 10, Mo.

### **AGENTS**

Desirable territories open for responsible representatives. Write giving complete information, lines carried and territory covered.

For more data circle 459 on Reader Service Card

# REDUCE INSPECTION COSTS...

*with Flame-Plated  
plug and ring gages*

**Steel Gages Flame-Plated with  
tungsten carbide:**

- ★ Outwear chrome-plated gages 20-1
- ★ Outwear solid carbide gages 3-1
- ★ Have the same thermal expansion as  
gage base metal
- ★ Are highly resistant to chipping and  
breaking

Cut inspection costs without sacrificing accuracy. Flame-Plated plug gages are available from leading gage suppliers in standard AGD sizes from .059 up . . . ring gages from .240 up.

Flame-Plating is a LINDE process for depositing a coating of tungsten carbide to parts and many tools. For the full Flame-Plating story, call your nearest LINDE office or send for your free copy of the new Flame-Plating booklet.



The term "Linde" is a registered trademark of Union Carbide and Carbon Corporation.

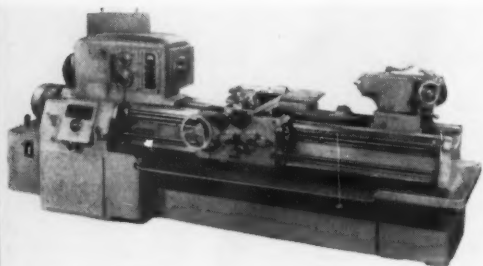
## LINDE AIR PRODUCTS COMPANY

A Division of Union Carbide and Carbon Corporation  
30 East 42nd Street **UCC** New York 17, N. Y.  
Offices in Principal Cities

In Canada: DOMINION OXYGEN COMPANY  
Division of Union Carbide Canada Limited, Toronto

For more data circle 460 on Reader Service Card

**new shop equipment . . .**



**Monarch Series 62 Preselector Dyna-Shift Lathe**

using the speed preselection, the face of the surface speed dial also registers the speed at which the spindle is rotating. However, when the operator resets the work diameter dial to a pre-selected speed, the surface speed dial is also reset and then indicates the new

r.p.m. at which the spindle will rotate following the shift. On the other hand, the spindle r.p.m. indicator does not show the preselected speed until the shift actually takes place.

The Series 62 Preselector Dyna-Shift Lathe is available in four models; namely, the Models 130, 131, 1130 and 1131. The Model 130 swings 13 inches over the cross slide and has a clearance diameter of 20 inches. The Model 131 swings 16 inches over the cross slide and has a clearance diameter of 24 inches. The Models 1130 and 1131 are provided with more accessory equipment for the greater flexibility desired in toolroom work.

For more data circle 84 on Reader Service Card

★ ★ ★

**MACHINE UTILIZES TWO  
TRANSFER MECHANISMS**

The Avey Drilling Machine Co., Cincinnati 1, Ohio, has announced the



**RUEMELIN FUME COLLECTORS KEEP SHOP CLEAR OF WELDING FUMES**

This well ventilated welding department is typical of hundreds of similar installations. Welding operators appreciate smoke and gas-free atmosphere. Thousands in service. Many repeat orders. Collecting fumes at the source with local exhaust hoods has proven most practical in operation. It is particularly helpful in winter months when doors and windows are closed.

Write for Bulletin 37-E describing all types of Ruemelin Fume Collectors.

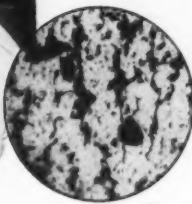
**RUEMELIN MFG. CO., 3996 NO. PALMER ST. • MILWAUKEE 12, WIS., U. S. A.**  
Mfrs. & Engr. • Sand Blast & Dust Collecting Equipment

For more data circle 461 on Reader Service Card

*select most practical*



## COOLANT CLEANING



Composite swarf from wet O.D. grinder — magnified 60 diameters.

### USE **BARNESDRIL** LABORATORY RESEARCH

To help you get production efficiency in the use of coolants, Barnesdril maintains complete laboratory facilities for testing samples of contaminated coolants and other industrial fluids. From these tests, the characteristics and quantity of contaminants can easily be determined, and studied for recommendation as to the best possible method for efficient removal.



Composite steel swarf from super-finish grinder — magnified 60 diameters.



*When you have coolant purification problems send them to Barnesdril Engineers.*

Composite honing swarf — magnified 60 diameters.

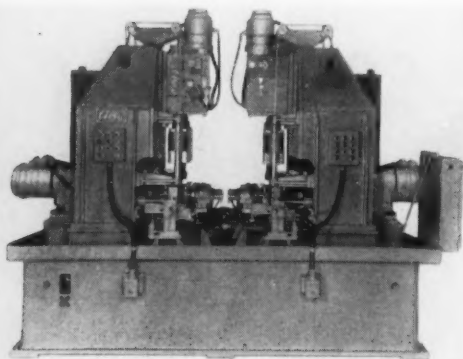


## FILTRATION DIVISION **BARNES DRILL CO.**

860 CHESTNUT STREET • ROCKFORD, ILLINOIS

For more data circle 462 on Reader Service Card

**new shop equipment . . .**



**Avey "Line-O-Dex" Transfer Type Machine**

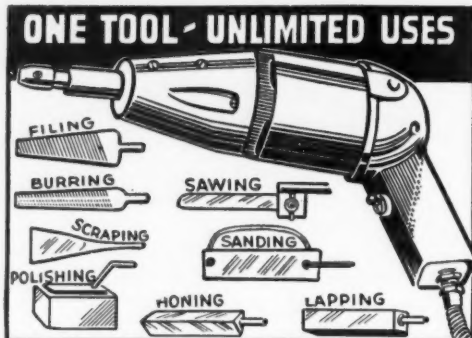
"Line-O-Dex" Transfer Machine which consists of two individually mounted transfer mechanisms mounted on a

common base. Each transfer mechanism is arranged with two No. 2 Avey cam feed units, each driving three-spindle oil-circulating drill heads, one from a vertical position and one from a horizontal position. Each half of the machine is arranged with a straight line set of transfer rails with a chute feed which drops one part at a time into the transfer rail. The parts are advanced by a hydraulic indexing cylinder along the transfer rails, three parts at a time. After one group of three parts is indexed, they are clamped by means of automatic hydraulic fixtures, whereupon the drilling and the deburring cycle takes place, after which the Line-O-Dex Index indexes the three previously drilled parts on to the injection end of the transfer mechanism.

Each cam feed unit is arranged with a hydraulically operated slide so that the units can be withdrawn to their backward-most position for quick ac-

## STOP . . . HAND WORK

Use these Handy PORTABLE ELECTRIC RECIPROCATING TOOLS for Greater Production, Better, More Uniform Work — All with less Operator Fatigue. Fixed strokes are  $\frac{1}{8}$ " or  $\frac{3}{8}$ " long. Operate on 110 volts AC-DC. Deliver 1000 PUSH-PULL strokes per minute.



*Try one of these tools on your next job.*

### ACME TOOL COMPANY

73 WEST BROADWAY

NEW YORK 7, N. Y.

For more data circle 463 on Reader Service Card





ask your  
**Bunting**  
distributor...

**... for the finest bearing  
bronze available from stock**

Bunting Bronze Bearings and Bars are made of a special Bronze alloy developed in Bunting metallurgical laboratories through study of innumerable bearing applications and many rigid tests. Known as Bunting No. 72 bearing bronze alloy (SAE 660) this Bronze embodies superlative anti-friction properties together with easy machineability and long life.

**Bunting**®

BRONZE BEARINGS • BUSHINGS • PRECISION BRONZE BARS  
**THE BUNTING BRASS AND BRONZE COMPANY**  
TOLEDO 1, OHIO  
BRANCHES IN PRINCIPAL CITIES

For more data circle 464 on Reader Service Card

**HE HAS IT**

Your Bunting Distributor carries in stock completely machined and finished Bunting Standard Stock Industrial Bearings, Electric Motor Bearings and Precision Bronze Bars in a complete range of sizes, meeting all your usual production and maintenance needs. You will find him listed in the classified section of your telephone book—most likely under the heading Bars, Bronze or Bearings, Bronze. He is an industrial distributor or a specialist in certain industrial items. Ask him for the Bunting Catalog or write.



## new shop equipment . . .

cess to tools during tool change. The operation of the machine is completely automatic, requiring only tool changing and chip removal by the operator. On each half of the machine, three parts are drilled simultaneously, burred, redrilled at double speed and may, if desired, be deburred. The loading

operation is performed while machining operations are in progress. A telephone stepping switch is used to sequence these complex operations.

For more data circle 85 on Reader Service Card

★ ★ ★

## HEAT TREATING FURNACE USES PROTECTIVE GAS ATMOSPHERE

Cooley Electric Mfg. Corp., 34 S. Shelby, Indianapolis, Ind., has announced a general-purpose heat treating furnace which is designed to use a newly-developed protective atmosphere for general hardening of tool steels, carburizing and similar operations. According to the manufacturer, steel hardened in this equipment is clean and free from decarburization. The atmos-

phere is a newly-developed protective atmosphere for general hardening of tool steels, carburizing and similar operations. According to the manufacturer, steel hardened in this equipment is clean and free from decarburization. The atmos-



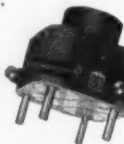
## We're Looking for Head Hunters!

Most machine tool men have long relied upon the "US" Adjustable Multiple Spindle Drill Heads. But we are looking for those who still haven't tried them . . . and who are looking for the best.

With their quick-change universal joint assemblies, they are built for continuous use, with full anti-friction bearing construction for high capacity thrust loads. The universal joint adjustable multiple spindle type is suitable for any sensitive drilling machine. Joints are self-lubricating. All gears are hardened and shaved with spindles superfinished.

The single eccentric type is used for equally spaced holes on bolt circles.

The new double eccentric AdjUStatix, two to eight spindles, permits spindles to be located in non-symmetrical patterns. It eliminates expensive change in set-up.



Universal joint with slip spindle fixed locating plate



Double eccentric type for irregular spacing

**Write** for details on any type of universal joint adjustable head. Ask also about our totally enclosed gear-driven adjustable, fixed center, or individual lead screw tapping heads.

## UNITED STATES DRILL HEAD COMPANY

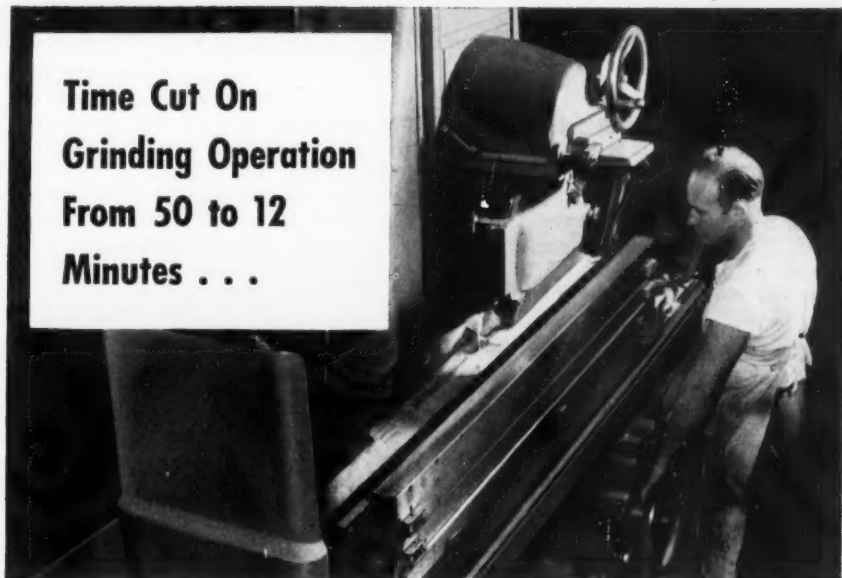
616-618 BURNS STREET • CINCINNATI 4, OHIO

For more data circle 465 on Reader Service Card



Cooley Protective Atmosphere Heat Treating Furnace

**Time Cut On  
Grinding Operation  
From 50 to 12  
Minutes . . .**



**With SUNDSTRAND  
"POWER-GRIP"  
Magnetic Chucks**

Here's another good example of time savings with Sundstrand Magnetic Chucks. Two airplane flap tracks are held at one time for grinding on opposite faces of rail. Grinding stroke is 70 inches. Former time with conventional

holding equipment was 50 minutes. With change to Sundstrand "Power-Grip" Chucks time is cut to 12 minutes . . . a savings of 38 minutes per part.

There's a good chance that you may be able to save considerable time in milling or grinding operations with Sundstrand "Power-Grip" Magnetic Chucks. Call in a Sundstrand Engineer. There is no obligation for this service.



**Free  
Data**

is available on Sundstrand Clamping fixtures. Write today. Ask for bulletin 555-M.



**SUNDSTRAND  
Magnetic Products Co.**

Division of Sundstrand Machine Tool Co.  
1020-9th ST. • ROCKFORD, ILLINOIS

For more data circle 466 on Reader Service Card

## new shop equipment . . .

phere system consists of a cracking unit to which is fed, by means of a variable speed pump, a mixture of alcohol and water proportioned according to the type of treatment desired. This mixture is cracked into gas of a controlled analysis to maintain the correct carbon potential for

equilibrium with the particular type of steel being treated.

To ensure a complete seal, the furnace is equipped with an Inconel retort which has a welded thermocouple well and a welded pipe extension to provide for gas admission. At the front the door is tightly sealed against the retort face. The chamber dimensions of the furnace are 8 x 6 x 14 inches and the power rating is 4.8 kw. at 230 volts. The door is said to be

easily handled by the use of a foot treadle, leaving both of the operator's hands free for convenience in work handling.

For more data circle 86 on Reader Service Card

★ ★ ★

## AUTOMATIC BEARING LUBRICATOR

Designated as the Model No. 33AB-4, a large-capacity bearing lubrication unit of the oil fog type which offers unique automatic control features has been announced by C. A. Norgren Co., 3435 S. Elati St., Englewood, Colo. The unit has a 4½-gallon oil capacity and utilizes twin lubricator heads which may be used simultaneously or individually, depending

## SET your machines level and **KEEP** them level!



for better performance

. . . less maintenance

EMPCO Leveling Jacks provide a solid, adjustable support for machine tools, industrial furnaces, tool room and production equipment of all types. Easily installed—easily relocated, Empco Jacks cut maintenance costs . . . Keep machine performance at peak efficiency!

Vi-Sorb Mounting Pads are optional with Empco Jacks. They control vibration from within the machine itself, and reduce transmitted vibrations.

Empco Jacks are available in two styles and 6 models. There's an Empco Jack that will meet your exact requirements!

WRITE TODAY FOR ILLUSTRATED BULLETIN AND PRICES!



THE ENTERPRISE MACHINE PARTS CORPORATION  
2715 Jerome Avenue • Detroit 12, Michigan

For more data circle 467 on Reader Service Card

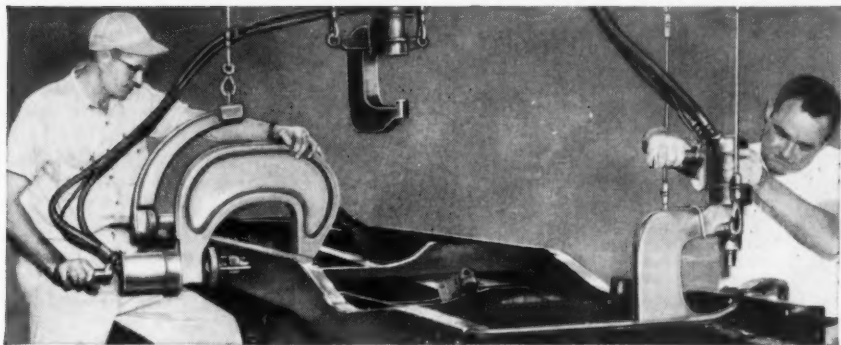
**CP  
cold riveting  
tools  
put the**

**squeeze**

**on  
assembly  
costs**

Light and compact for easy handling, the CP Hydraulic Punch exerts 25-tons of pressure to punch holes for running-board brackets, while the compact 18-ton Hydraulic Riveter speedily drives the  $\frac{3}{8}$ " cold rivets home! With CP Cold Riveting tools there's no heating or "bucking-up".

Large tonnage capacity and accurate pressure control afford simple one-man operation. Operators need no special training to handle CP Hydraulic Riveting equipment. Because of their noiseless operating qualities, operators and workers in the immediate vicinity work without distraction.



**Chicago Pneumatic**

8 East 44th Street, New York 17, N.Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES  
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

For more data circle 468 on Reader Service Card

May, 1955

modern machine shop 265

## new shop equipment . . .

on fog requirements for the specific application.

According to the manufacturer, the fine micro-fog generated can be carried great distances with a minimum

### C A M S

Fully equipped modern machine shop with extensive Jig Boring, Surface Grinding, Horizontal Boring and Thread Grinding facilities as well as modern Cam Milling and Cam Grinding equipment.

**Your Inquiries Answered Promptly**

**HIMOFF MACHINE CO., INC.**

23-16 44th Road Long Island City 1, N. Y.

For more data circle 469 on Reader Service Card

## RAYMAC *Solid Carbide* DRILLS and REAMERS

Raymac drills cut hardened metal . . . do not burn or anneal. Feature operational speeds of 350 to 600 RPMs depending on size and hardness of metal.

Raymac solid carbide reamers are custom designed for individual jobs.

Write for catalog No. 12

## RAYMAC

**MANUFACTURING COMPANY INC.**

3729 CASS AVENUE, DETROIT 1, MICH.

For more data circle 470 on Reader Service Card

266 modern machine shop



Norgren No. 33AB-4 Bearing Lubrication Unit

of precipitation in the lines and can be uniformly distributed to multiple bearing lubrication points having a maximum total of 1,000 bearing inches. It is a very compact unit, measuring only 27 x 12½ x 16½ inches. Three 2-inch fog outlets provide flexibility of installation.

A system of automatic controls provides warning signals or other safeguards against depletion of oil supply, failure of air supply or excessive pressure in the oil supply tank. Micro-fog delivery is said to automatically start and stop in coordination with the machine operation.

**LW**

Only  
**\$132.00**

Write for free  
catalog on dividing  
heads, power hack saws, vises and magnetic chucks.

**L-W CHUCK COMPANY**  
28 SO. ST. CLAIR STREET TOLEDO 4, OHIO

### 6½" Swing DIVIDING HEAD

For more data circle 471 on Reader Service Card

May, 1955



# STEP-UP Your Light Precision Machining with LIGHT TEN LATHES

Here is a whole series of small lathes designed and built to do your light precision machining. All have the same sturdy construction, the same convenience and ease of operation. Send for complete catalog and select the lathe which exactly suits your needs.

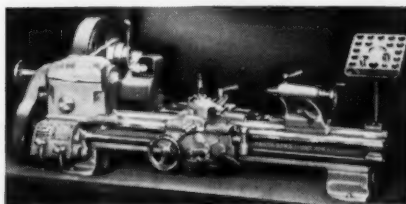
## SPECIFICATIONS

Swing — 10" over bed  
Collet Capacity —  $\frac{5}{8}$ " max.  
Spindle Bore — 27/32"  
Distances Between Centers  
16 $\frac{1}{8}$ " to 34 $\frac{1}{8}$ " max.  
Spindle Speeds (approx.)  
12-speed drives — 48 to  
1435 r.p.m.  
16-speed drives — 52 to  
1365 r.p.m.

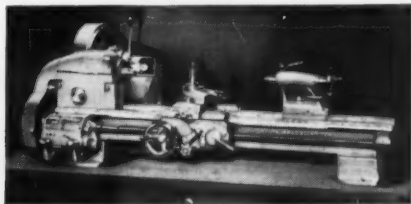
Power Longitudinal Feeds  
Toolroom and Model A —  
48, .0015" to .0853". Model  
B — 26, .0021" to .0155".  
Model C — 14, .0021" to  
.0156".  
Power Cross Feeds  
Toolroom and Model A —  
48, .0004" to .0255". Model  
B — 23, .0009" to .0046".  
Model C — manual



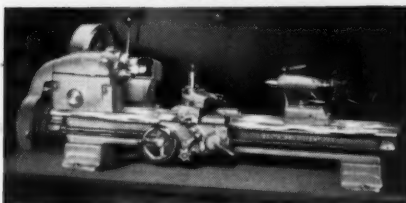
Light Ten Floor Lathe — Model A  
Base Price \$786



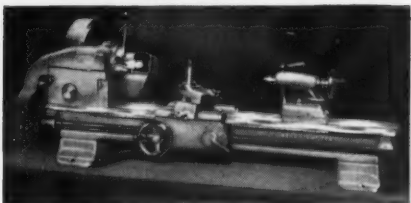
Light Ten Toolroom Precision Bench Lathe  
Base Price \$731



Light Ten Bench Lathe — Model A  
Base Price \$500



Light Ten Bench Lathe — Model B  
Base Price \$424



Light Ten Bench Lathe — Model C  
Base Price \$354

Compared with our costs  
**OUR PRICES ARE LOWER**  
than they were back in 1941

WAGES UP	MATERIALS UP	PRICES UP ONLY
155%	131%	49%

Prices are closely tied to costs. Costs are still rising. Buy now before increased costs necessitate higher prices.

### SEND INFORMATION CHECKED:

- ☐ 9" and 10" BENCH LATHES ☐ 10" to 16-24" FLOOR LATHES ☐ DRILL PRESSES ☐ TOOL GRINDERS ☐ 1 $\frac{1}{2}$ " & 3" Collet TURRET LATHES ☐ 7" BENCH SHAPERS

Name \_\_\_\_\_ Street \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

Building Better Tools Since 1906 • **SOUTH BEND LATHE** • South Bend 22, Indiana



For more data circle 472 on Reader Service Card

## new shop equipment . . .

Other features of the unit include visible oil feed and oil supply; filtered incoming air, with collected moisture automatically drained; continuous control of oil fog output; centrally located electrical connections; and identified terminals and wiring. Air requirements are variable depend-

ing upon oil fog output, the maximum being 27 c.f.m at 60 p.s.i. operating pressure.

For more data circle 87 on Reader Service Card

★ ★ ★

## AIR RAM HAS POWER FACTOR OF 15 TIMES AIR LINE PRESSURE

Identified as the "Speedy" Model 70, an air ram with a power factor of 15 times the air line pressure has been announced by W. R. Brown Corp., 2649 N. Normandy Ave., Chicago 35, Ill. The powerful air ram utilizes an extra heavy-duty diaphragm which is said to be rigidly gripped between two ground iron surfaces and which is 100 per cent leakproof. According to the manufacturer, there are no piston cups or packings to leak or wear out, and no lubrication is required. The unit can be operated submerged in oils

straighten coil stock as you feed it

with a



# LITTELL

Variable Speed  
Straightener




Model 412-SPD Heavy Duty Straightener Straightens steel up to 125" thick and up to 12" wide

A Littell straightener removes the curvature from coil stock. The press, slitter or shear receives a continuous strip of pre-straightened stock. Equipped with variable speed transmissions, Littell Straighteners are adjustable to meet a wide range of speed requirements in automatic feeding. They also simplify hand feeding. A variety of medium and heavy duty models straighten coil stock of all standard widths and thickness.

Write for the Littell Straightener Catalog

F. J.



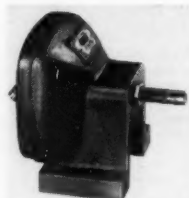
ROLL FEEDS • DIAL FEEDS • REELS  
STRAIGHTENING MACHINES • AIR BLAST VALVES

District Offices: Detroit, Cleveland

4163 N. RAVENSWOOD AVE., CHICAGO 13, ILL.

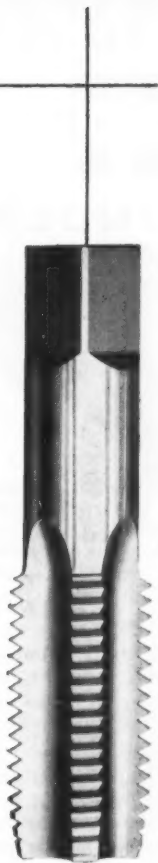
Speed with Safety

For more data circle 473 on Reader Service Card



Brown "Speedy"  
Model 70 Air Ram

# BAY STATE



**TAPS FOR PRODUCTION...**

in all standard and special sizes . . . are available from your nearby Bay State Tap distributor. Gain precision performance on every tapping job with controlled contour taps, made by BAY STATE TAP & DIE CO., MANSFIELD, MASS.

For more data circle 474 on Reader Service Card

**HIGHER SPEEDS!  
FASTER GRINDING!**

**kipp**

## AIR GRINDERS

MODEL JA  
50,000 R.P.M.

**\$42<sup>00</sup>**

IN U.S.A.



Weight 12 ounces;  
length 6 $\frac{1}{4}$  inches;  
chuck size  $\frac{1}{4}$  inch.  
Wheel guard removed  
for better illustration.

The RPM's stay up while grinding . . . not only when the grinder runs idle. That means better work—longer wheel life.

High speed grinding with small wheels was a Madison-Kipp development of the late twenties. It was born out of a pressing need in our tool room. Because tool room grinding problems are universal, we believe it will pay you to utilize Kipp grinders in your tool room as generally as we do in our own.

**kipp**

### MADISON-KIPP CORP.

208 Waubesa St., Madison 10, Wis., U.S.A.

For more data circle 475 on Reader Service Card

270 modern machine shop

### new shop equipment . . .

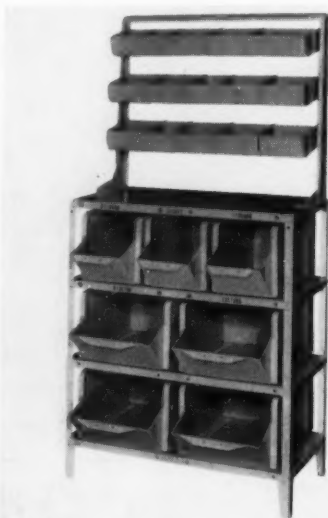
or solvents. The stroke of the unit is  $\frac{5}{8}$  inch with spring return. The threaded ram screw has  $2\frac{1}{2}$ -inch adjustment. Any pressure up to 1 ton is claimed to be obtainable when the unit is used with a pressure regulator.

For more data circle 88 on Reader Service Card

★ ★ ★

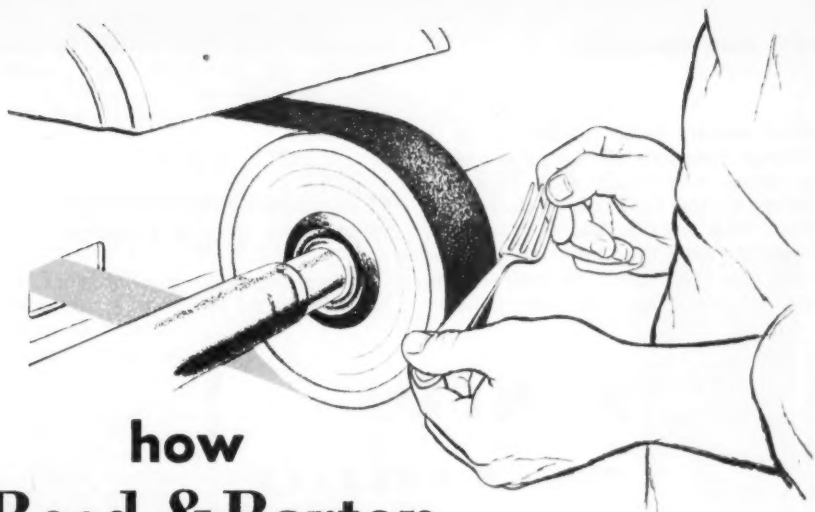
### MODULE UNIT SIMPLIFIES AND EXPEDITES ASSEMBLY OPERATIONS

Bathey Mfg. Co., 100 S. Mill St., Plymouth, Mich., has announced a module unit which is designed to provide maximum flexibility of arrangements for parts storage and assembly operations. The stand measures 14 inches deep x 28 inches long x 30 inches high and is fabricated of heavy-gauge steel with welded joints and



Bathey Module Unit for assembly operations

May, 1955



## how Reed & Barton rolled up new finishing records for spoons and forks!

To roll the burred outer edges of nickel silver spoons and forks, Reed & Barton, nationally-famous manufacturers of tableware, employed the most effective method known to them. Yet this method was troublesome, time-consuming and comparatively costly. Abrasive Products Engineers were asked for recommendations. After careful study, their suggestion produced a 30% improvement in overall speed and efficiency of the process by using Jewel Brand Belts. More uniform quality of finishing resulted. Belt breakage was reduced to a minimum.

Here is another typical example of the way Jewel Brand Abrasive Engineers cooperate to produce better, more economical methods of using abrasives. This is an important part of their daily "stock-in-trade" along with a complete line of top-grade Jewel Brand Abrasive Belts. Maybe this combination can help you find a better, more economical way to use abrasives. Call your nearby Jewel Brand Abrasive Engineer or Industrial Distributor, or write . . . Abrasive Products Inc., 507 Pearl Street, South Braintree 85, Massachusetts.



For more data circle 476 on Reade Service Card

**new shop equipment . . .**

baked enamel finish. Drilled holes in strategic locations permit grouping of the stands into various units with connecting shelves for large or small work areas. The smooth top work area is designed to permit the attachment of bench top bin units. The module unit can be combined with other Bathey

equipment to provide storage facilities suitable for practically any manufacturing operation.

For more data circle 89 on Reader Service Card

★ ★ ★

**REVOLVING STOP ENSURES  
PRECISION STOCK LENGTH**

Marcellus Mfg. Co., Belvidere, Ill., has announced a revolving stop which

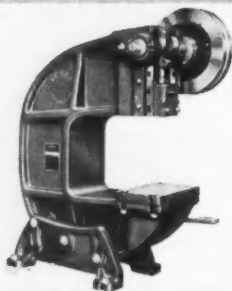
is said to ensure maximum precision of stock length on screw machine work. The stop has a free-turning head which revolves easily on ball bearings, thus minimizing friction, heat and scoring of the work and the stop face. Fine pitch threads are said to permit making micro - adjustments for length without disturbing the body of the tool. The stop is designed with a shoulder on the body which rests against the turret for positive location. The body, it is said, cannot be moved backward under pressure. For added versatility, the stop sleeve can be reversed in the body and used through the turret for machining long workpieces.

**KENCO**

1½ to 15 ton

**PUNCH PRESSES**

**...dependable**

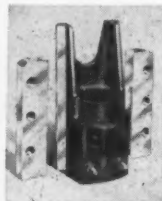


You get precision punching and high volume consistently with a Kenco press. It's built to eliminate downtime — with long-wearing parts and trouble-free assemblies. Needs adjustments seldom . . . replacements practically never. Write for literature.

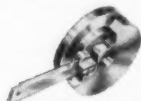
**KENCO MANUFACTURING CO.**

*Mfrs. of Precision Machinery and Accessories*

5211-A TELEGRAPH ROAD, LOS ANGELES 22, CALIFORNIA



Extra long ram ways permit full use of guiding area to insure precision punching.



High strength castings used on clutch collar (illustrated), frame and ram ways — for extra rigidity and wear.

For more data circle 477 on Reader Service Card

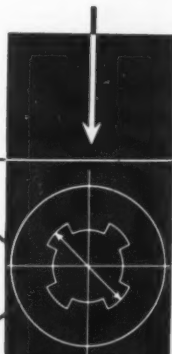
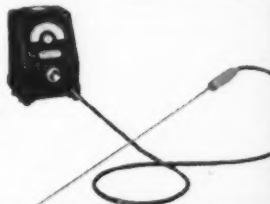


# What's The Best Way To Gage These Parts?

**Tips from Taft-Peirce on when and where to use a T-P CompAIRator Air Gage**

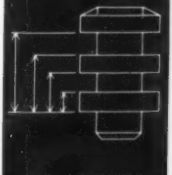
## Helical Groove Diameter Tolerance: .002"

A single dial T-P CompAIRator Air Gage checks the helical rifling groove diameters in this 22 caliber rifle bore 32" long. Gaging member slides in and out of bore, checks groove diameter at all points. Extremely sensitive yet sturdy — vibration, jarring, tilting won't disturb its accuracy.



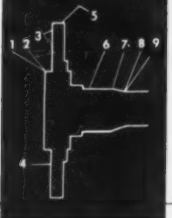
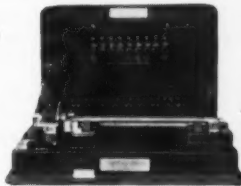
## Four Heights Tolerance: .002"

One four dial T-P CompAIRator checks four land heights simultaneously on this spool valve. Tilted line-type dials facilitate reading. Pointer action is positive, instantaneous. CompAIRators can be designed to check any specific tolerance range from .0001" to .125".



## OD, Squareness, Runout, Concentricity Tolerances: from .0005" to .003"

This T-P CompAIRator combines air-electric, standard air, and computing air circuits to check 5 diameters, 2 runouts, one flatness, and one concentricity simultaneously on auto rear axles. Lights indicate dimensions out of tolerance. Exclusive T-P Computing CompAIRator circuits figure runout, flatness and concentricity. Eliminate usual four measurements and computations.



For more examples and the complete story on Taft-Peirce CompAIRator Air Gages send for Bulletin.

### WHAT IS A COMPAIRATOR AIR GAGE?

A CompAIRator is a sensitive gaging instrument that measures variations in the velocity of tiny jets of air. When work is placed over these jets, air flow is restricted and its velocity reduced. Any change in air velocity reflects a change in part size, which is immediately shown on a calibrated indicator. Since only air contacts the part in most cases, there is minimum wear on gaging members. Fast, accurate, dependable, a T-P CompAIRator is simple to operate, requires little or no maintenance.

*T-P means  
Top Precision*



STANDARD AND SPECIAL  
COMPAIRATORS



COMPUTING  
COMPAIRATORS



AUTOMATIC SORTING  
MACHINE



AIR ELECTRIC  
COMPAIRATORS

THE TAFT-PEIRCE MANUFACTURING COMPANY, WOONSOCKET, RHODE ISLAND

For more data circle 478 on Reader Service Card

# GAMMONS

## TAPER REAMERS

for all types of die work



- Specially treated for modern die steels.
- Rapid cutting capacity.
- Large range of standard sizes.
- Tapers per inch: .005, .008, .013.

**GAMMONS • HOAGLUND CO.**  
 MANCHESTER 2, CONN.  
 Manufacturers of helical taper pin, chucking,  
 die makers and special reamers.

For more data circle 479 on Reader Service Card  
 274 modern machine shop

new shop equipment . . .



Marcellus Revolving Stop for screw machines

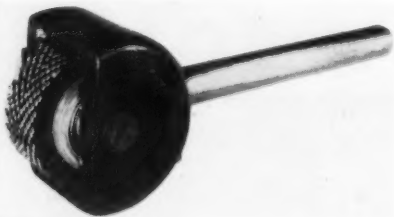
The stop can be furnished with a carbide face or with special face recessed at the center to allow accurate locating of work having cut-off burrs. The stop is available in three sizes; namely, the Model OORS with 39/64-inch face and 5/8-inch shank; the Model ORS with 3/4-inch face and 3/4-inch shank; and the Model 2RS with 1-inch face and 1-inch shank.

For more data circle 90 on Reader Service Card

★ ★ ★

## WIDE MECHANICAL WHEEL DRESSER HAS 17 CUTTER DISCS

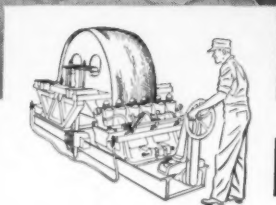
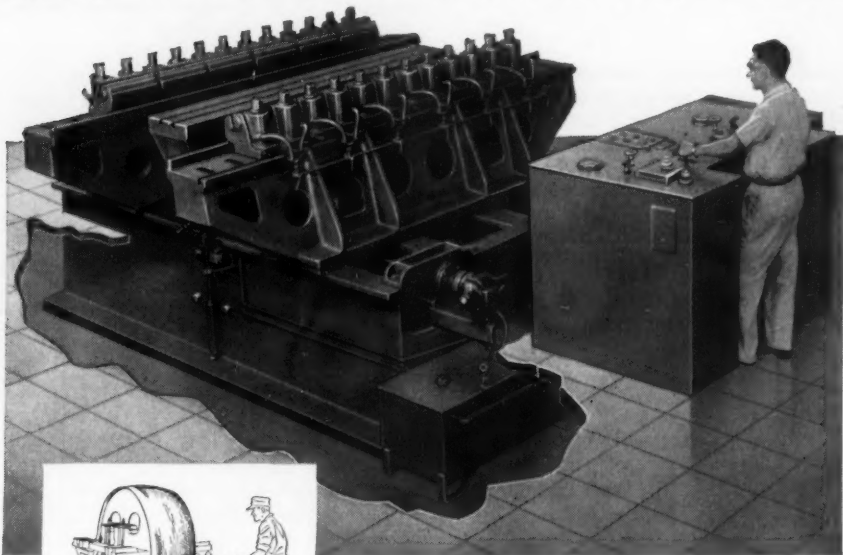
Aer-O-Matic Tool Co., 5059 W. Diversey Ave., Chicago 39, Ill., has announced a wide mechanical wheel dresser which features a 2 5/8-inch outer diameter and seventeen 16-gauge cutter discs. There are 29 cutter teeth per cutter with a full 3/8-inch tooth length. The dresser utilizes a large diameter



Aer-O-Matic Mechanical Wheel Dresser

May, 1955

## ERCO HYDRAULIC STRETCHING PRESS



**ERCO** speeds your  
production, cuts initial cost and maintenance!

No need to invest in expensive presses and dies — no need for slow and costly hand work!

The ERCO Stretching Press produces large and small double curvature sheet metal sections by gripping the metal on two ends and stretching it over inexpensive forms. Forms can be made of cast iron, wood, kirkstone, concrete or plastic.

ERCO pioneered the Hydraulic Stretch-

ing Press over 16 years ago when airplane production demanded a speedy way to make accurately shaped sub-assemblies. Still a "must" in aircraft manufacture . . . also used now in the production of truck and bus bodies, metal boats and in other industries . . . it may quickly pay for itself in your plant.

If you need fast, economical production — and low maintenance cost, you need ERCO!

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information  
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INCORPORATED

RIVERDALE, MARYLAND

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May, 1955

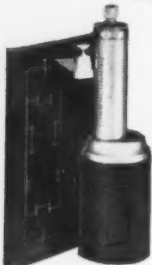
modern machine shop 275

## new shop equipment . . .

shaft to provide maximum rigidity. The precision ball bearings utilized by the tool are a single Neoprene sealed type, mounted so the sealed side is exposed. Preload is set on the bearings at the time the units are assembled, and it is not necessary to reset preload

### MICRO-HEIGHT GAUGE

BY FAIRFIELD GAUGE CO.



**NO OTHER GAUGE  
COMPARES FOR  
FAST, ACCURATE  
LAYOUT AND  
MEASURING**

Capacities to  
6" when used  
with this  
Fairfield Gauge  
3" Riser

The Micro-Height Gauge is a precision instrument, finished in satin chrome, which reads like a micrometer and measures from zero at base to 3" in thousandths. Use as a scribe for fast layout, or insert dial indicator for quick, accurate inspection.

**FAIRFIELD GAUGE COMPANY**

170 Herbert Street  
BRIDGEPORT 6, CONN.

For more data circle 481 on Reader Service Card

while in use. According to the manufacturer, 10 to 15 micro finishes can be obtained with the dresser.

The dresser is available in three other styles with the same features for practically any type of grinding application. It can also be furnished with spacers where a grinding application requires opening a wheel further for more freeness of cutting action. Holders for the spindle unit are available for almost any type of grinder.

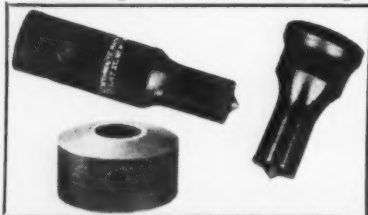
For more data circle 91 on Reader Service Card

★ ★ ★

### AUTOMATIC-CYCLE CHAMFERING MACHINE FOR HYPOID PINIONS

A single-station Burr-Master, Model BM-2148, for chamfering hypoid pinions without requiring a skilled operator has been announced by Modern Industrial Engineering Co., 14230 Birchwood Ave., Detroit 38, Mich. Production rate is said to be more than 250 pinions per hour per machine, and one operator can readily handle two machines. The push-button actuated machining cycle is completely automatic with the Burr-Master coming to a stop with cutting tools retracted when the cut is completed. Since the machine generates the chamfer uniformly, it eliminates all sharp corners well into the root of the tooth. Pinions are inserted, shaft down, into the opening provided in the work station, and

## So many standard styles . . . one must be just right for you!



For 66 years we have been producing metalworking tools and adding to our standard line. Today we have PUNCHES and DIES in a large range of round, flat, oval, and square sizes, to fit most makes of punch presses, immediately available from stock at regular low, standard prices.

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317 East 47th St., New York 17, N. Y.

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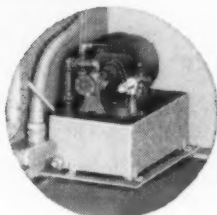
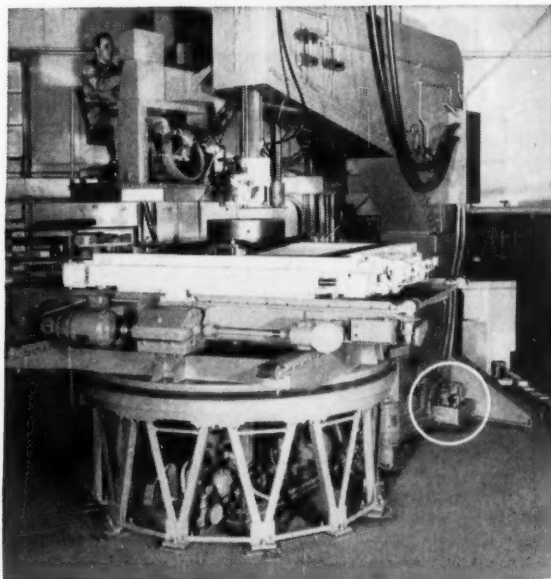
A LITTLE



VALVE does a big job  
on

**THE WORLD'S  
LARGEST  
BAND SAW  
AND FILER**

built by The DoAll Co.,  
Des Plaines, Ill., for the  
Air Force's "Heavy  
Press Program"



Operated by remote control from a suspended platform, this huge machine cuts intricate die cavities in die blanks weighing up to ten tons. Intended for the world's largest extrusion press (14,000 tons), these dies will shape the largest and longest structural aluminum extrusions ever produced. Jaws for the world's largest extrusion stretch-conditioner (3,000,000) are also cut on this Band Saw.

● **FULFLO VALVES**

By-Pass, Oil-Relief, Piston Type Hydraulic for machine tool hydraulic mechanism, oil-burning equipment, rams, presses and Diesel engines.

STANDARD OR FLANGE TYPES  
for pressures from 0# to 500#

Write for personal copy,

**FULFLO  
MECHANICAL  
DATA BOOK**



**THE FULFLO SPECIALTIES CO. Inc.**  
PUMP AND VALVE MANUFACTURERS  
BLANCHESTER, OHIO

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**WHITEHEAD**



by using Whitehead Stock Washer Dies.

**1500 SPECIAL SIZE DIES ON HAND.**

Whitehead makes washers and shims from any metal or special material to your specifications. Thickness from .002" to  $\frac{3}{8}$ ".

*In stock:* S.A.E. standard light, medium, and heavy steel washers; brass and copper, small and large patterns; bolt sizes. Write for Whitehead's Catalog.

54-4



**WHITEHEAD  
STAMPING CO.**

1673 W. Lafayette Blvd.

Detroit 16, Michigan

For more data circle 484 on Reader Service Card

278 modern machine shop

## new shop equipment . . .

the radial locator lever is actuated by the operator to make certain the part is radially located. This action energizes the clamping circuit, and the part is then clamped by depressing a push-button. The machining cycle is started by means of two push-buttons which are located on opposite sides of the machine for safety.

The high speed steel cutting tools used are specially developed form tools of the dovetail type. When regrind is necessary, tools are reset without gaging merely by bringing them against a stop bearing on the tool face. Relief grinding is said to be unnecessary, making several hundred regrinds per tool possible. Since the tools always stop in the retracted position, loading is simplified and possible tool damage is prevented. Cutting is dry, coolant not being required. Depth of cut is readily adjustable for the single cutting stroke required to deburr and chamfer



**Burr-Master BM-214B Chamfering Machine**

May, 1955

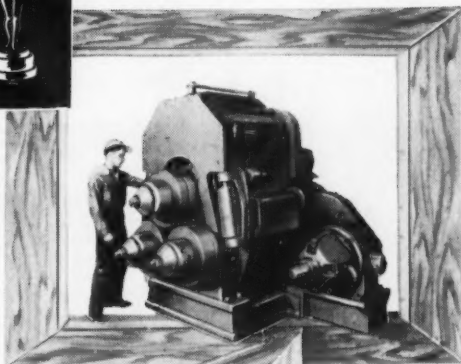


# No Matter What You Roll

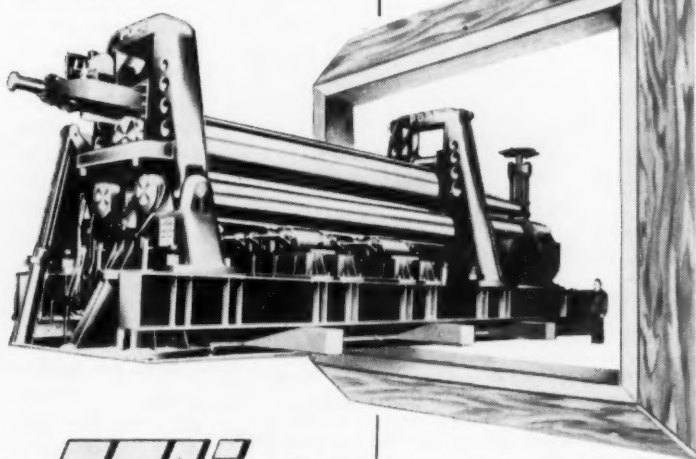
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"PRODUCTION OSCARS"  
with Kling  
ANGLE or PLATE ROLLS

You can duplicate, for example, the time- and money-saving record of Douglas Aircraft Co., Inc. with Kling-Pope Plate Rolls; or of Commercial Tank & Welding Co. with Kling Angle Rolls.

These and the many other Kling Metal Fabricating Machines are illustrated and described in the new Kling Complete Line Bulletin 100. Why not send for your copy today?



A



B

**A.** Nos. 1-A and 2-A Kling Angle Rolls. Send for new Angle Roll Bulletin 600.

**B.** 3 in. x 20 ft. Pyramid Type Kling-Pope Plate Roll.

931MM  
**Kling**

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1320 N. KOSTNER AVENUE • CHICAGO 51, ILLINOIS  
Makers of Friction Saws; Rotary, Double Angle and Guillotine Shears; Punches; Combination Shear, Punch and Coper; Angle and Plate Bending Rolls; Bulldozers.

Export Distributor: Simmons Machine Tool Corp., 50 East 42nd Street, New York 17, N. Y.

For more data circle 485 on Reader Service Card

May, 1955

modern machine shop 279

## **new shop equipment . . .**

a tooth. Automatic indexing of the pinion takes place during the return stroke of the tools, permitting two cutting strokes per second.

All wear parts are hardened and ground, and anti-friction bearings are used throughout. Automatic interlocks actuate the machine and release locks

in proper sequence. The machine is provided with a built-in chip disposal chute.

For more data circle 92 on Reader Service Card

★ ★ ★

## **ANGLE PLATES AND HEIGHT BLOCKS**

A complete line of height blocks and angle plates with heat treated, alloyed

aluminum bodies and hardened steel tops and bottoms have been announced by Machine Products Corp., Dept. D, 6771 E. McNichols Rd., Detroit 12, Mich. Both the height blocks and the angle plates can be used singly or in combination to secure a wide range of heights for varied work requirements. Shot pins are provided on the height blocks for stacking. Aluminum bodies are used for lightness, and the hardened steel plates used for the top and bottom are said to assure continued accuracy. Six sizes of angle plates are standard, ranging in height from 24 to 72 inches. Jog blocks inside the angle plate are provided for slight

**NEW JOHNSON** MODEL "M"  
**"MOBILE" BAND SAW**



**WHEEL IT ANYWHERE!**

Capacity—5" rounds, 10" flats

A Band Saw with PORTABILITY-PLUS . . . It's a natural for contractors of all kinds, or manufacturers, where it is advantageous to wheel the saw to the cutting job. It rolls easily over floors or even rough ground. Eliminates slow, laborious hand cutting of structural steel, pipes, conduits, angle iron, re-inforcing rods, etc. Carries its own extra blade supply. Modernize your facilities with one or more of these revolutionary machines now.

SEND FOR CATALOG AND NAME OF LOCAL DEALER

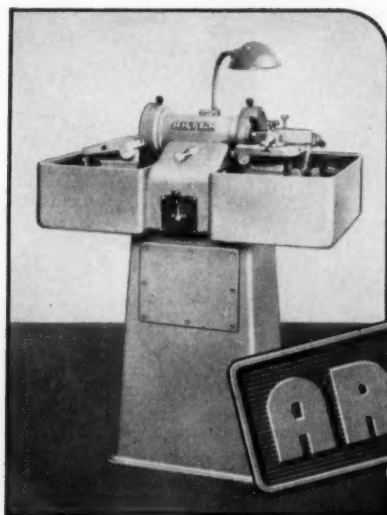
**JOHNSON MANUFACTURING CORP.**

1011 BARNES ST.

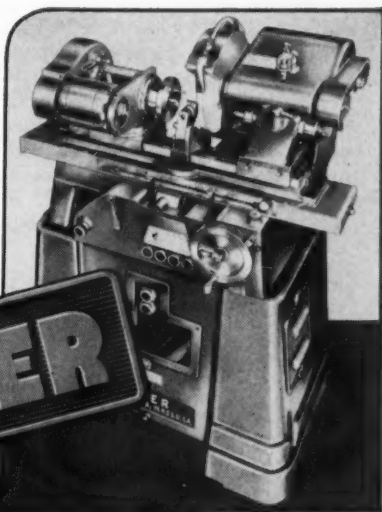
ALBION, MICHIGAN

For more data circle 406 on Reader Service Card

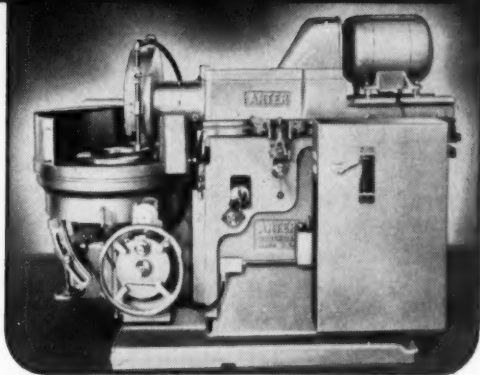
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**CARBIDE  
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GRINDERS**



**CYLINDRICAL  
GRINDERS**



**ROTARY SURFACE GRINDERS**

Chuck Capacity 8" to 40"

**INTERNAL  
GRINDERS**

The Arter trademark on these machines is the sign of

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Tell our engineers your grinding problems.

They'll find a way to lick them.

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**WORCESTER • MASSACHUSETTS**

*Agents in industrial centers of United States and Canada*

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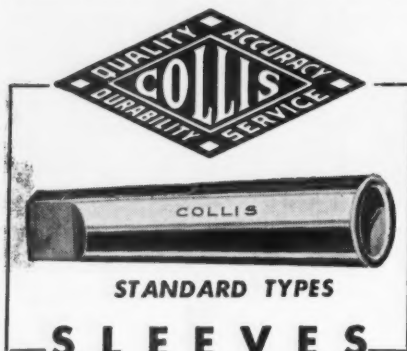
May, 1955

modern machine shop 281

**new shop equipment . . .**

movement. Stop blocks on the sides are designed to square the angle plate with the surface plate, if necessary.

Height blocks range in height from 5 to 20 inches in 5-inch increments. They are said to be parallel to plus or minus 0.005 inch in 12 inches, and heights are plus or minus 0.001 inch within size. In addition to the standard



**STANDARD TYPES**

**S L E E V E S**  
**AND**  
**S O C K E T S**

**NOW!**

**HEAT TREATED . . .**

*So popular with users.*

COLLIS Heat Treated Sleeves and Sockets are manufactured by skilled workmen to give long durable service and extra long life. This type of sleeve has less chance of nicks and assures same accuracy with longer runs.

Call at once for our representative to explain about the Complete Collis Line of Lathe Centers, Arbors, Drill Drifts, and Magic Type Chucks as well as Sleeves and Sockets and Collis.

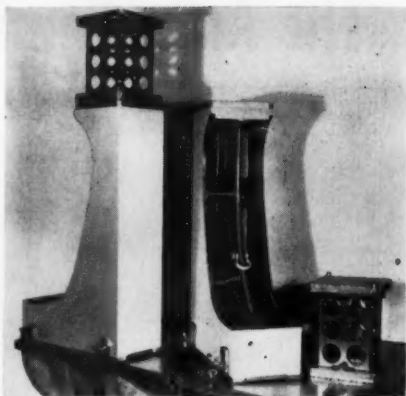
*"Call Collis for Service"*

**THE COLLIS CO.**

**DEPT. A, CLINTON, IOWA**

For more data circle 488 on Reader Service Card .

282 modern machine shop



**Machine Products Height Blocks and Angle Plates with alloy aluminum bodies**

sizes available, specials in both height blocks and angle plates can be furnished.

For more data circle 93 on Reader Service Card

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**BENCH MARKING MACHINE  
OPERATES AT HIGH RATE  
OF SPEED**

Designated as the E.P.I., a bench marking machine which is designed to perform a quality marking job at a high rate of speed has been announced by Pryor Steel Stamps, 216 W. Jackson Blvd., Chicago 6, Ill. The outstanding feature of the machine is said to

**A Real Spring Winder!**



Will earn its cost in one day. The Hjorth Perfection Spring Winder offers the ideal means of winding extension, compression, torsion, taper, double taper, or left hand springs. Try one in your shop. You'll like it and the price is reasonable.

No. 1 Capacity 0 thru 3/32" wire \$1.50

No. 2 Capacity 0 thru 3/16" wire \$3.00

No. 3 Capacity 0 thru 5/16" wire \$5.00

**HJORTH LATHE & TOOL CO.**

**10 BEACON STREET**

**WOBURN, MASS.**

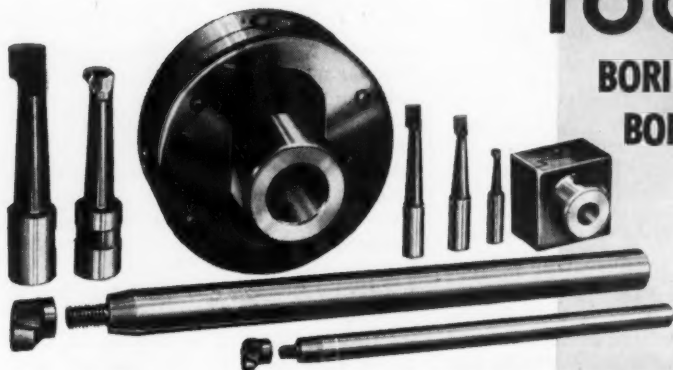
For more data circle 489 on Reader Service Card

May, 1955

for more *Accurate* cuts...  
greater *Rigidity* in

## BORING TOOLS

BORING HEADS  
BORING BARS



## Use **CRITERION** BORING EQUIPMENT

### BORING PROBLEMS? CLOSE TOLERANCE?

Try Criterion Boring Tools. Built with the same care and quality as the time-tested Criterion Boring Head.

### THIS COMBINATION WILL PRODUCE RESULTS.

Boring heads from 1½ to 7 inch diameter. Boring tools, carbide or high speed steel, ¾ to 1¼ inches diameter. Bore holes from ⅛ to 20 inch diameter.

Accuracy for the closest tolerance • Rigidity for the heavy cuts • Heat-treated parts for long wear

### LARGE OFFSET SAVES TIME AND TOOL CHANGES

These tools will cut your boring costs.

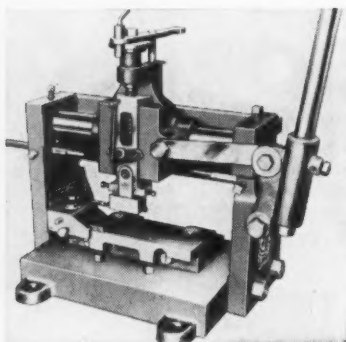
See the complete line of **CRITERION TOOL PRODUCTS** at your local dealers or write for free catalog.

**CRITERION  
MACHINE WORKS**

**9312 SANTA MONICA BLVD • BEVERLY HILLS, CALIF.**

For more data circle 490 on Reader Service Card

**new shop equipment . . .**



**Pryor E.P.I. High-Speed Bench Marker**

be the ease with which it can be set up to mark a wide variety of flat or cylindrical pieces. Simple adjustments, it is claimed, make it possible to ensure

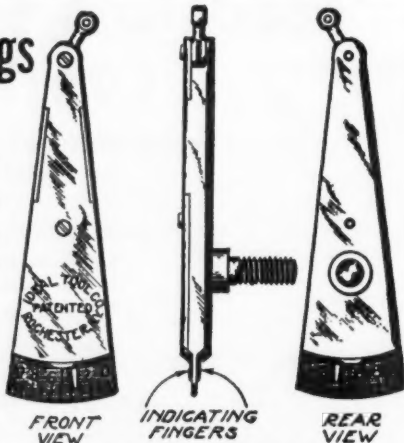
evenness of impression and accuracy of mark no matter what the shape of the piece. Straight type is used in flat holders to mark round pieces, and segmental type is used with round holders to mark flat stock. Flat, solid steel dies can also be furnished for marking cylindrical parts.

A hand lever draws the carriage, to which the marking die or holder is attached, along a round slide bar. The tendency of the carriage to turn around this bar is resisted by a tongue sliding between two flat bars at the rear. Jack screws elevate or lower the bars to secure evenness of impression where the work may be slightly tapered from back to front, and to compensate for the deflection caused by load on the machine and the work. The pressure necessary to indent the work is provided by a square threaded screw moving a dovetailed adjustable slide in the carriage. The handle of this screw can instantly be loosened and

## **DIAL Indicator Readings From Front or Rear**

- Accurate readings from the front or rear of an IDEAL INDICATOR is especially helpful when locating holes or where the indicator is fastened to a revolving spindle.

- IDEAL INDICATORS have been serving industry for 40 years with complete satisfaction. Prices shown include holder. Why pay more for superior service?



**Price . . . \$6.00**

**Write for complete details.**

**IDEAL TOOL CO., 407 RIVER ST., ROCHESTER 12, N. Y**

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# ELECTRICAL CONTROLS FOR INDUSTRY

## NEUTROL ELECTRO-MAGNETIC CHUCK CONTROL



50 to 15,000 Watts  
... 60 to 20,000 Sq.  
In. Chuck Area.

Releases and demagnetizes work pieces simultaneously. No time lost. No damage to work or chuck face. Protects chuck from voltage surges. Speeds production.

## ELECTRO-MATIC RECTIFIER



50 Watts to 40  
Kilowatts

Engineered for dependable power conversion in constant year after year service. Quiet and efficient. For all industrial applications.

## NEUTROLATOR

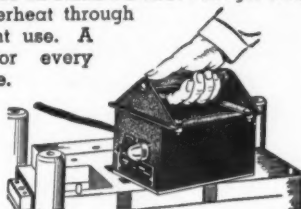
### NEUTROL CHUCK CON- TROL and HOLDING POWER REGULATOR



Combines the advantages of NEUTROL with the benefits of absolute voltage regulation. Control of holding power is infinitely variable through entire dial range. Best holding power predetermined for an operation is automatically repeated. Assures true parallel grinding. Manual or automatic control models.

## ELECTRO-MATIC A.C. DEMAGNETIZER

Demagnetizes dies, punches, cutters, tools that have been magnetized from any source. Works by simple contact. Operates on standard A.C. voltage. Will not overheat through constant use. A size for every purpose.



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**Special Models Engineered to Meet Every Need  
Your Inquiries Will Be Promptly Answered Without Obligation.**

**ELECTRO-MATIC PRODUCTS CO.**

**2235-37 N. KNOX AVE., CHICAGO 39, ILLINOIS, U. S. A.**

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# Specify



## PRESS ROOM EQUIPMENT

### ROLL FEEDS

Accurate Feeding —  
Reversible  
Easy to install  
Highest Quality  
Increased  
Production at  
Low Cost



### SCRAP CHOPPER

Fits any Power  
Press  
Electrical Plug  
Installation.  
Pays for itself  
you get more  
for your scrap.



### STOCK OILER

Saves your dies  
eliminates hand  
oiling.  
Made in variety  
of sizes



*Write Now*

for new catalog showing prices and complete line of Equipment.

## DURANT Tool Supply Co.

136 SOUTH WATER STREET, PROVIDENCE 3, R. I.

*new shop equipment . . .*

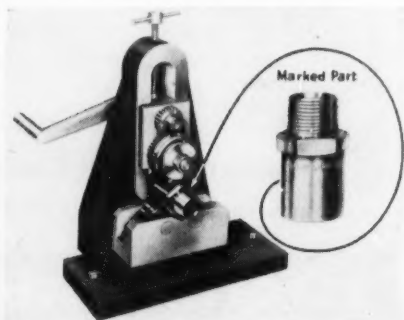
reclamped in any position, and acts with a stop at the rear which can be drawn out in order to maintain depth settings when repetition work is being done.

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★ ★ ★

## STAMPING FIXTURE FOR MARKING PERIPHERY OF ROUND PARTS

Identified as the Model GRD-960-2, a stamping fixture for marking around the periphery of any solid or tubular round metal part has been developed by M. E. Cunningham Co., 1051 Chateau St., Pittsburgh 33, Pa. According to the manufacturer, the fixture can also be adapted to marking flat parts, and it will mark also any size tubular product or up to 5-inch diameter solid parts. The unit consists of four basic parts; namely, a cast steel base with side flanges for bolting to a bench, a cradle or mandrel depending on whether solid or tubular products are to be marked, a roller marking die and a gear-mounted handle. When the handle is turned, the gear arrangement



Cunningham GRD-960-2 Stamping Fixture

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286 modern machine shop

May, 1955



## DYKEM STEEL BLUE

### Stops Losses

making Dies and  
Templates

Popular package  
8-oz. can fitted  
with Bakelite cap  
holding soft-hair  
brush for applying right  
at bench; metal surface  
ready for layout in a few min-  
utes. The dark blue background  
makes the scribed lines show up in  
sharp relief, prevents metal glare.  
Increases efficiency and accuracy.

Write for sample on company letterhead  
**THE DYKEM COMPANY**  
2301F North 11th St. • St. Louis 6, Mo.

With DYKEM Steel Blue



Without DYKEM Steel Blue



For more data circle 494 on Reader Service Card

## LUERS

### PATENTED CUTTING OFF TOOL HOLDERS PATENTED CUTTING OFF BLADES

ONLY the PATENTED construction of LUERS cutting off BLADES permits normal expansion of bursting chips — MEANS MAXIMUM CUTTING EFFICIENCY.

Manufactured by  
**J. MILTON LUERS, 12 Pine Street, Mt. Clemens, Mich.**  
Produced under License Issued by John Milton Luers Patents Inc.

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## 24-HR. SERVICE on

### *Special* CARBIDE TOOLS

Yes, 24-hour service on:

- ★ Modifying standard tools right out of stock to your specifications.
- ★ Re-working draw dies and punches.
- ★ Tube mill scarfing tools.

**Two and three-day service on  
NEW flat and circular form tools**

Please send inquiries to (Car-Mac Division)

## CAREY-McFALL CO.

2156 E. Dauphin Street • Phila. 25, Pa.

#### Standard tool



#### Modified to:



For more data circle 496 on Reader Service Card

## new shop equipment . . .

causes the die to move across the piece held in the cradle or mandrel.

Cradles are used when stamping solid or heavy wall rounds, and a mandrel is supplied for stamping light wall tubular products. The roller marking die may be either of the insert or solid style. Either single characters or logo-

types may be fitted into the insert style dies. Type capacity depends on the size of character to be used.

For more data circle 95 on Reader Service Card

★ ★ ★

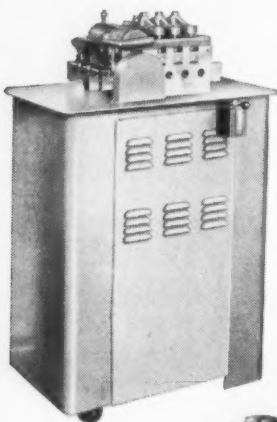
## GUSHER PUMP FOR CENTER COOLANT TROUGH MOUNTING

Designated as the Model "TL-15025K," a gusher pump which is ar-

ranged for center coolant trough mounting on traveling base machine tool installations has been introduced by The Ruthman Machinery Company, 1817 Reading Road, Cincinnati 2, Ohio.

The pump has a tapered tubular housing which is provided with a reinforced narrow section for passage through the limited width slot in the trough cov-

## Economy • Dependability

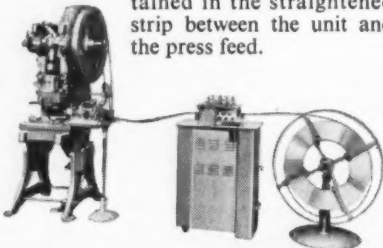


## WITTEK STOCK STRAIGHTENERS

Used in conjunction with a reel stand and automatic feed for punch presses, the Wittek Stock Straightener is a self-contained, motor-driven unit designed for maximum efficiency in the continuous straightening of coiled stock. Standard models handle stock with widths up to 12 inches. An infinitely variable speed drive permits any desired straightening speed so that the proper slack is maintained in the straightened strip between the unit and the press feed.

This typical Wittek automatic production feeding setup includes

—Wittek roll feed mounted on the punch press, Wittek stock straightener, and Wittek self-centering reel stand.



Write for full particulars

**WITTEK Manufacturing Co.**

4322 W. 24th Place • Chicago 23, Illinois



5577



Ruthman Model "TL-15025K" Gusher Coolant Pump

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## RECLINABLE POWER PRESSES



Ideal for general stamping work . . . 4 to 100 tons capacity. Can recline to 40° with perfect safety.

Our catalog contains a wide variety of press types and sizes. Write for it today.

\*51st year serving worldwide industry with Patent Percussion, Open Back, Double Crank, Punch, Horn, Toggle and Straight Side Presses, Dial and Roll Feeds.

**ZEH & HAHNEMANN CO.**  
190 VANDERPOOL ST. NEWARK 5, N. J.

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## GRANT RIVETERS



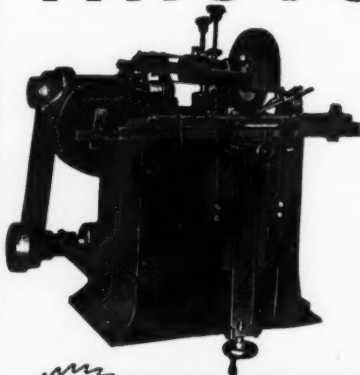
• Pioneers in the riveting field. Head rivets from smallest to 3/4" diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles. Write for literature—and don't forget to send samples.

**THE GRANT MFG. & MACHINE CO.**  
96 Sillman Ave. Bridgeport 5, Conn.

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## PAYS FOR ITSELF!

by sharpening just one  
gross of hack saw blades



You can resharpen a gross of hack saw blades at least 6 times—actually saving you the price of this machine.

**WARDWELL MODEL EC COMBINATION GRINDER** is the only single unit grinder adaptable for hack, band and circular saws that does not depend on the shape of the grinding wheel to form the shape of the tooth. This unique feature enables operator to grind a variety of blades without dressing or changing wheels.

Write for Bulletin EC Today.



**WARDWELL**

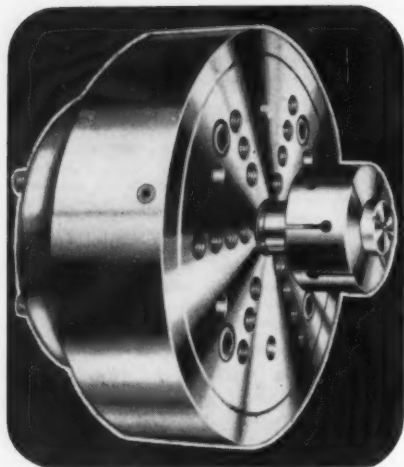
**MANUFACTURING CO.**  
3803 Ridge Road, CLEVELAND 9, OHIO

Maker of largest line of saw and tool sharpening machines

For more data circle 500 on Reader Service Card

# 9

## Reasons for You to Get the Facts on SPEEDGRIP CHUCKS



1. They increase production.
2. They give greater accuracy.
3. Set-up time is shorter.
4. They are safer to operate.
5. First cost is low.
6. Maintenance cost is low.
7. Design is simple
8. Guaranteed to do the job.
9. Service is prompt.



Speedgrip Precision  
Internal Chucks will save  
you money on second  
operation work.

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### SPEEDGRIP CHUCK

820 N. WARD ST. • ELKHART, INDIANA

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290 modern machine shop

## new shop equipment . . .

er. The unit is equipped with one-piece electronically-balanced shaft assembly which rotates on two-heavy-duty precision ball bearings, one of which is located within the top motor and ball housing and the other in the tubular portion of the bracket flange housing.

The Model TL-15025K, like all gusher pumps, has no packing glands nor metal-to-metal contacts below the liquid high level line. Thus liquids contaminated by dirt, grit and abrasives can be safely handled without injury to the pump which is provided with sufficient clearances to permit free passage of such liquids. The pump is equipped with a built-in electric motor which is available in 1/2, 3/4 and 1-h.p. sizes.

For more data circle 96 on Reader Service Card

★ ★ ★

## ELECTRONIC SORTING GAGE IS COMPLETELY AUTOMATIC

Designated as the Model 144 B-32, a completely automatic, multiple action, electronic sorting gage which measures the hardness, overall length,



Federal Model 144 B-32 Completely Automatic, Multiple Action, Electronic Sorting Gage

May, 1955





MARK OF QUALITY  
**STANDARD**  
**WOODRUFF KEYS**

We manufacture a complete line of Woodruff keys in all standard sizes. These sizes range from as small as 1/2" x 1/16" to keys as large as 3 1/2" x 3/4". All keys are carefully checked for burrs, slivers, etc., before being shipped to you. Only the finished tested keys are permitted to leave our plants.

We carry a complete stock of high quality, dependable keys. Send for our catalog for complete information on Woodruff keys, taper pins, machine keys, and machine racks.

**STANDARD STEEL SPECIALTY CO.**

BEAVER FALLS

PENNSYLVANIA

Formerly: Standard Steel Co., Beaver Falls, Pa.; Hammond, Ind.

# NUMBERALL

## Improved TYPE HOLDERS

Hand or Press style. Type can be easily, quickly loaded and unloaded. Simplest construction . . . Just a sturdy pin holds the type securely. No screws nor springs. Super-quality steel type made in various sizes: 1/32" up to 1/2" figures and letters.



Write for Bulletin MS23H

Steel Type

**NUMBERALL STAMP & TOOL CO.**

HUGUENOT PARK STATEN ISLAND 12, N. Y.

For more data circle 502 on Reader Service Card

For more data circle 503 on Reader Service Card

The  
**"MASTER  
COMPAR"**

## INDICATING MICROMETER COMPARATOR

has the

**VISIBLE feel**

No Arguments as to correctness of reading due to "feel"  
Use it as Comparator, Master Micrometer, Go & No Go Gage.

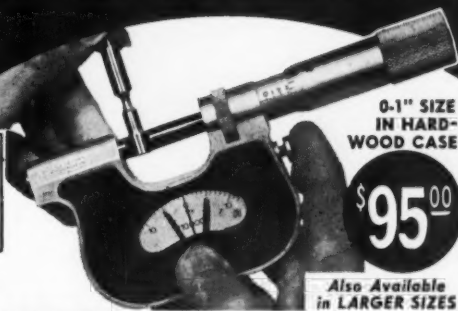
1" Range reading in 1/10,000"

To attain permanent accuracy at these close limits, highest precision workmanship and exclusive design of mechanism are of Major Importance and ONLY found in "MASTER COMPAR."



Ask for Illustrated  
Circular — Code GIOFF

Sold thru Tool Supply Houses  
Ask for Demonstration



0-1" SIZE  
IN HARD-  
WOOD CASE

**\$95<sup>00</sup>**

Also Available  
in LARGER SIZES

### A RIGHT HAND TOOL

Release button for movable Anvils on RIGHT Hand side enables you to hold tool the conventional way.

**NEW** — Resetting to Zero in 5 seconds

Quick adjustable tolerance hands. Heavy TUNGSTEN CARBIDE Anvils will actually measure Out-of-Roundness, Ovalness and Taper.

**GEO. SCHERR CO., INC.**

200-MM

LAFAYETTE ST. NEW YORK 12, N.Y.

COMPLETE LINE OF  
PRECISION INSTRUMENTS

For more data circle 504 on Reader Service Card

## **new shop equipment . . .**

triangular out-of-round, outside diameter and taper of automotive piston pins and sorts them into 10 size categories, including four o.d. groupings of 0.0001 inch each plus oversize and undersize, has been announced by Federal Products Corp., 5142 Eddy St., Providence 1, R. I. The gaging and sorting

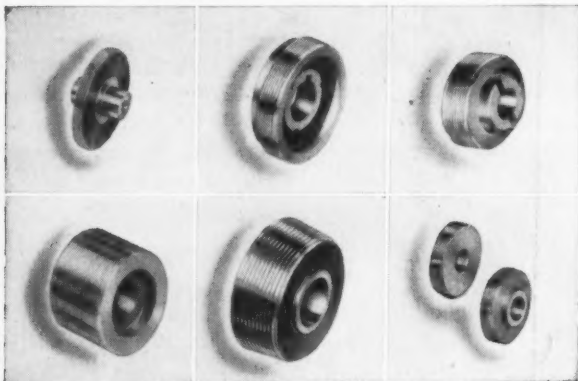
speed of the unit is said to be 4,000 plus workpieces per hour. The gage is designed for either conveyor or manual feed and disposal. From the magazine feed chute the piston pins roll into a four-cup index wheel where they are carried to the hardness station. There they are checked by a rebounding hammer in a marked scleroscope tube. Rejects pass out the rear of the gage. At this station the parts are also measured for overall length. Reject signals set a

mechanical "memory" for later disposal.

Next, the workpiece rolls into a chain conveyor which carries it to the out-of-round gaging station where it is rotated approximately 120 degrees and its high and low readings are found. Following the out-of-round station, the part is measured for o.d. and the "memory" is set for late sorting into one of four diameter groupings of 0.0001 inch each, plus over and undersize. The final gaging station measures for taper using the diameter gaging unit for a reference position. If the taper is greater than tolerance, the workpiece is later sorted into taper reject by the disposal. Electrical oper-

# **Thread Rolls**

*on automatic screw machines and turret lathes*



**produce uniform,  
accurate threads  
economically**

Reed makes special thread rolls of all kinds. Send us samples or detailed specifications of both roll and thread to be produced.

## **REED ROLLED THREAD DIE CO.**

Thread Rolling Machines and Dies, Thread Rolling Attachments,  
Thread Rolls and Knurls for Automatic Screw Machines and Turret Lathes  
WORCESTER, MASSACHUSETTS, U. S. A.

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**DRILL THESE HOLES**  
**BY A QUICK, EASY, INEXPENSIVE METHOD**  
 Your business letterhead will bring literature.  
**WATTS BROS. TOOL WORKS**  
 Wilmerding, Pa.

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**Make 3  
hammers  
AT ONCE!**

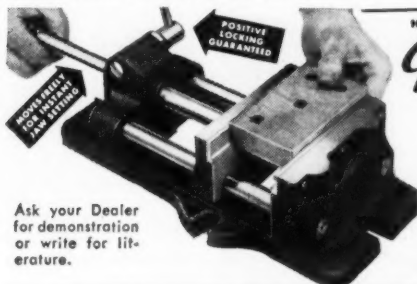


It's the NEW, easy, economical, quick way to mold your own lead hammers on a production basis with "SHUR-GRIP" handles and this COOK production mold.

Write for circular and prices  
**LAWRENCE H. COOK, INC.**

67 MASSASOIT AVENUE, EAST PROVIDENCE 14, R. I.

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Ask your Dealer for demonstration or write for literature.

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*Grip-Master*  
ALL RIGHTS RESERVED

**GRIPS WITH SPEED  
CUTS TOOLING COSTS**

Step up drill press production with the Heinrich "Grip-Master" Screwless Vise—with the patented "Circle Grip" hammer blows cannot break. Work is automatically leveled; jaws set instantly, effortlessly. 3", 4", 6", 8" jaw widths; ideal as base structure for drill jigs and fixtures.

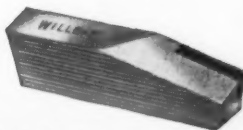
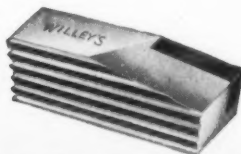
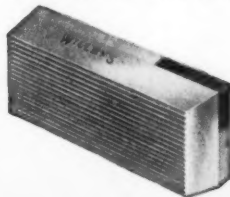
**HEINRICH TOOLS, INC.**  
 DEPT. 115-E • RACINE, WISCONSIN

For more data circle 508 on Reader Service Card

## SERRATED CUTTER BLADES

Carbide Tipped with Willey's Metal

Serrations are ground after heat treating, for greatest accuracy. Send your prints or a sample of the blade you are now using. Also specify grade of carbide—or the material to be machined. We also make solid carbide blades for various cutters. Write for prices and catalog.



**SPECIAL TOOLS—Prompt quotes on receipt of prints**



**WILLEY'S CARBIDE TOOL CO.**

SOLE MAKERS OF WILLEY'S METAL

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Detroit 1, Michigan

For more data circle 509 on Reader Service Card

**new shop equipment . . .**

ation of the five gaging stations and all recycling is controlled automatically.

For more data circle 97 on Reader Service Card

★ ★ ★

**6-INCH ABRASIVE BELT GRINDER**

To meet the need in many metal, wood, ceramic and plastic shops for an

all-round utility grinder, The Engelberg Huller Co., Inc., 103 Seneca St., Syracuse, N. Y., has added the 6-inch Model 648 to its line of abrasive belt grinders. Principal applications of the Model 648 include free-hand work, such as flat surfacing, squaring, rounding, deburring, chamfering and polishing. It is said to be especially suited to job shops, toolrooms, maintenance and repair departments. The machine is adjustable to either vertical or horizontal

position (or to any intervening angle). Its 6-inch belt is backed by an unusually large platen, measuring  $6\frac{3}{8} \times 14\frac{1}{8}$  inches, and will handle fairly large, as well as small, workpieces. In the horizontal position, long workpieces overhanging the ends of the machine can be worked.

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... see how diamond  
can cut your finishing  
costs... how to use  
diamond most  
economically.

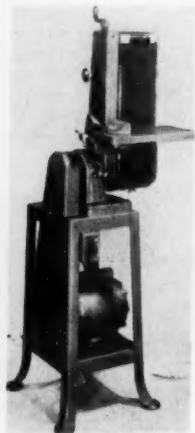
**ELGIN Diamond**  
... another famous-for-quality ELGIN Product

Precision graded in Elgin's own laboratories and scientifically compounded for maximum abrasive efficiency... recognized as the standard for diamond abrasive quality. Elgin Diamond saves hours of finishing time more precious than diamond itself. Write today for your copy of "Finish with diamond—ELGIN DIAMOND".

**ABRASIVE DIVISION, DEPT. P**

**ELGIN NATIONAL WATCH COMPANY**  
ELGIN, ILLINOIS

For more data circle 510 on Reader Service Card



**Engelberg Huller  
Model 648 6-Inch  
Abrasive Belt Grinder**

**CUT TOOL COSTS**

broken tools made like new again with **NU-TANGS**

Twisted or broken tangs replaced at low costs on any tool with a Morse Taper (sizes 1 to 6). Hundreds of leading industries save money on drills, reamers, countersinks, cutters, drivers, the NU-TANG way. Prompt delivery. Send fee prices—no send tools for repair. All work guaranteed.

**NO WELDING! NO SLEEVES! NO SHORTENING! NO DISTORTION!**

**GUARANTEED STRONG AS NEW!**

Send them to us like this! We return them like this!

Patent No. 2,312,043 **NU-TANGS INC.** 1339 Bates Avenue Cincinnati 25, Ohio

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and  
**Large Precision Machining**  
Done to your specifications

**We Have 13 Jig Borers**

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**LAY-OUT AND IDENTIFICATION DYE**

**7 COLORS**

For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheets, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for sample and circular on company letterhead.

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Accurate, low cost turning on tough continuous-run work. Preloaded, matched roller bearings assure rigid set-up. Precision ground shank. Heavy-duty grease seal. Many exclusive features.

for  
lathe and grinder  
tail stocks



FREE BULLETIN 105  
"What you should know about LIVE CENTERS"

**FALLS PRODUCTS, INC., 124 Genoa Street, GENOA, ILL., U.S.A.**

For more data circle 514 on Reader Service Card

## new shop equipment . . .

The work table is adjustable to 45 degrees from the belt and 20 degrees toward the belt. It is slotted for an adjustable angle gage calibrated for any

# R E I D

## TOOL ROOM ACCESSORIES

### CONTROL BALL HANDLES



Round Plastic



Oval Plastic



Round Steel



Mushroom Plastic

**FREE**  
NEW 56-Pg.  
**CAT.**

The REID Line also includes c.i. hand knobs, hand wheels, machine handles, compression springs and scores of other needed tool room items.

**REID TOOL SUPPLY CO.**

Muskegon Heights, Michigan

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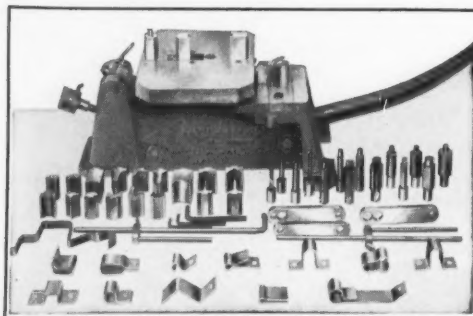
angle up to 90 degrees. Belt changes on the grinder can be made quickly without tilting the idler pulley. The operator merely opens the hinged top cover and side guard, turns a crank to release belt tension, slips the old belt off and the new belt on, tightens the crank—and the grinder is again ready for operation. A large knob on the side of the machine regulates tracking. The drive unit of the machine is either a 1-h.p. 60-cycle single-phase 110/220-volt motor or a 1-h.p. 60-cycle triple-phase 220/440-volt motor. Belt speeds of 2,800 and 4,000 s.f.p.m. are available with a 1,725 r.p.m. motor. The machine occupies less than 3 square feet of floor space.

For more data circle 98 on Reader Service Card

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## AIR-OIL BOOSTER DELIVERS UNLIMITED AMOUNT OF HIGH PRESSURE FLUID

A continuous-action, automatically reciprocating air-hydraulic booster which is said to be capable of delivering an unlimited amount of high pressure fluid for the operation of hydraulic cylinders has been announced by Miller Fluid Power Co., 2040 N. Hawthorne Ave., Melrose Park, Ill. The booster operates from ordinary plant compressor air input and is said to of-



## Multiform

### BENDER CUTTER

Users report the Multiform Bender one of the handiest tools in the shop. No special tooling . . . Bends, Cuts, Punches, Flats, Rounds into Any Shape, Clamps, Brackets, Springs, Busbars, Wire Forms, Aircraft Work, Steel Rule Dies, Etc.

**AIR OR HAND MODELS FOR UP TO 1/4" to 4" MATERIAL**

Write for brochure which illustrates and describes the four bender models.

**J. A. RICHARDS CO.**

Dept. 6-M

Kalamazoo, Mich.

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## Empire LIVE CENTERS

ARE  
• ACCURATE • VERSATILE  
• HEAVY DUTY

THE TAPERED  
SEAT ASSURES  
ACCURACY OF  
± .0001



Manufactured in  
all tapers. 1 to  
6 MT in stock.  
Special shanks  
and points  
made  
to order.

PAT.  
PEND.

Points  
illustrated  
are  
standard.



Ask your Supplier or Write for Literature.

**ROYAL PRODUCTS**

89 UNION ST.

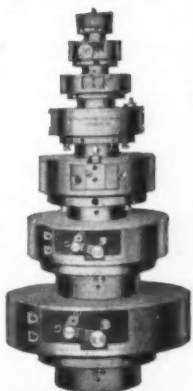
MINEOLA, N. Y.

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## MUMMERT-DIXON FACINGHEADS

Two-way tool feed  
in 9, 12, 16, 20, 24,  
30, 36, 40 and 46  
sizes.

One-way tool feed  
in 6, 9 and 12 sizes.  
Automatic feed —  
convenient tool ad-  
justment — quick  
feed reverse. Save  
time and costly set-  
ups.



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folder.

**MUMMERT-DIXON CO.**

120 PHILADELPHIA ST.

• HANOVER, PA.

For more data circle 518 on Reader Service Card

## People work better when they SEE BETTER



## MAGNI-FOCUSER

**SPEEDS PRODUCTION**

**With Third Dimensional (3-D) Vision**

**Leaves both hands free to work**

Magni-Focuser—the binocular magnifier—reduces eye-strain and prevents squinting—thereby speeding production, increasing accuracy and minimizing the chance of errors and accidents.

Gauge reading, layout work, inspection, tool and die work are just a few of the jobs that need the Magni-Focuser. Speeds precision assemblies, blue print work. Restores the usefulness of the skilled hands of many older workers whose vision needs a seeing aid.

Magni-Focuser can help your plant produce better. Immediate delivery. 10-day trial without obligation. Return to us if not satisfied. \$10.50.

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### At Western Electric's Kearny Works

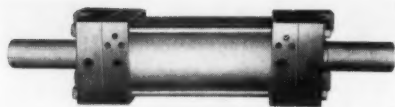
the MAGNI-FOCUSER is used in the mechanical laboratory for reading fine calibrations.

**EDROY PRODUCTS CO.** 480 Lexington Ave.,  
Dept. P, New York 17, N. Y.

For more data circle 519 on Reader Service Card

**new shop equipment . . .**

fer definite operational advantages in applications where large volumes of high pressure fluid are required. Essentially, the booster consists of a double-rod end air cylinder with a hydraulic discharge pressure chamber at each end; thus, it delivers a pressure output stroke in both directions.



**Miller Reciprocating Air-Hydraulic Booster**

At the end of each stroke, the piston assembly contacts an actuator button on the inside of the cylinder. The movement of this button operates the actua-

tor which, in turn, shifts the position of a four-way, two-position, double pilot operated valve causing reversal of air flow and corresponding reversal of booster stroke. The booster is available in all ratios to give pressures to 10,000 p.s.i. and over. The reciprocating booster can be furnished in 25 to 1 ratio units that produce 2,000 p.s.i. hydraulic output from 80 p.s.i. air input and consists of a 5-inch diameter air piston driving two 1-inch diameter hydraulic rams, each ram having a stroke of 6 inches, and a 4.7 cubic inch oil displacement per stroke or 9.4 cubic inches per cycle. It is especially recommended for operations requiring high hold-

## **Tap-Cartridges**

**PERMIT TAPPING TO THE  
VERY BOTTOM OF THE  
HOLE...WITH NO  
ALLOWANCE  
FOR CHIP  
ROOM**



### **CARTRIDGE TAPPING**

- Eliminates Chip Clean-Out.
- Increases Tap Life up to 5 or 10 times.
- Available in sizes from 0-80 up and for any drill depth.
- Available in blank, coil or strip form.

Cartridge Tapping consists of tapping into and through an extrudable tap cartridge (containing Carnauba Wax and High Grade Mineral Oil) which has been inserted (manually or automatically) into the drilled hole.

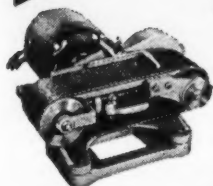
**THE  
TAP-  
CARTRIDGE  
CO.**

**YOUR SOLUTION  
TO THE BLIND  
HOLE TAPPING  
PROBLEM...**

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**DOES IT BETTER  
DOES IT FASTER**



### **SIMPLEX-M ABRASIVE BAND GRINDER**

The precision of a machine tool plus the durability of a workhorse. Complete with 1/2 H.P. Heavy Duty Motor and automatic band tension control. Nothing like it for finishing metals, plastics, wood, fibre, etc.

**OTHER STYLES AND SIZES IN NEW  
MANUAL ON FINISHING—WRITE TODAY**

### **WALLS SALES CORP.**

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## *Peaslee* **TAPER PINS**

### **STANDARD AND SPECIAL**

*Stainless Steel*  
**PRECISION GROUND**  
ALSO  
SMALL PARTS  
DOWELS—STRAIGHT  
FORMS  
MADE TO BLUEPRINTS



DEALERS INQUIRIES INVITED

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EAST HARTFORD, CONN.

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1/2" Drill, cap. speeds up to 3600 RPM  
Dist. Spindle to column—21"  
Dist. chuck to base—16 1/2"

Precision Spindle, Ball Bearing Mounted  
Rugged Construction, Weight 700 lbs.

PRICE COMPLETE

REDUCED TO

**\$450.00**

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**WE STOCK ALL  
REPLACEMENT PARTS**

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LIBERAL TRADE IN ALLOWANCES  
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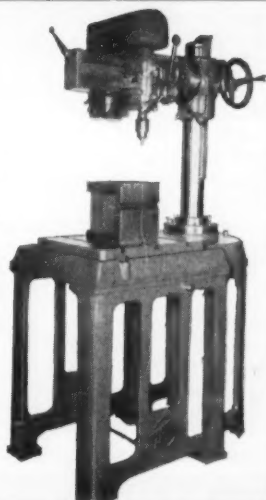
## **CAPITOL MACHINERY CORP.**

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Phone WOrth 4-7615

NEW YORK 12, N. Y.

For more data circle 523 on Reader Service Card



**new shop equipment . . .**

ing pressure without generating heat or wear and without consuming power. It is also said to be well adapted for handling special output fluids.

For more data circle 99 on Reader Service Card

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**COOLANT ELIMINATES FOUL  
ODORS FOR TWO MONTHS**

To eliminate offensive odors caused by rancid coolants, S. C. Johnson & Son, Inc., Industrial Products Division, Racine, Wis., has developed a water soluble cutting fluid, designated as Johnson's TL-131, which is said to be guaranteed not to turn sour and smell for two full months. This, according to the producer, is a sufficient length of time to carry the average shop through



*Illustration showing Johnson's TL-131 Cutting Fluid being used in a machining operation*

the hot, humid days this coming summer when coolant odors will be most widespread. Johnson's TL-131 is used in the conventional manner, the only condition being that the machine should be cleaned and then completely

★ ★ ★ ★ ★



**THESE ENDS WITH ONE  
STROKE OF PUNCH PRESS**

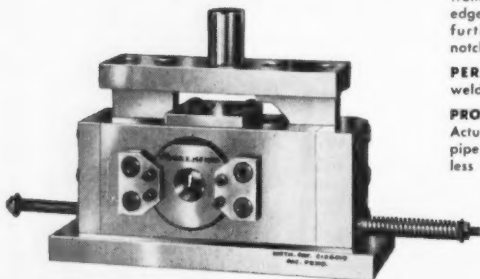
**ARC-FIT TWIN NOTCH**

**NO DEFORMATION** Shears from inside out—cuts clean edges; eliminates need for further finishing; aligns notches automatically.

**PERFECT "T" Joints** for welding or brazing.

**PRODUCTION NOTCHING**  
Actual production time per pipe or tube end reduced to less than 3 seconds.

**INTERCHANGEABLE**  
Punches and dies up to 2½" O.D. pipe or tube for STANDARD TWIN NOTCH.  
(Special units available up to 3" O.D.)



PATENT PENDING

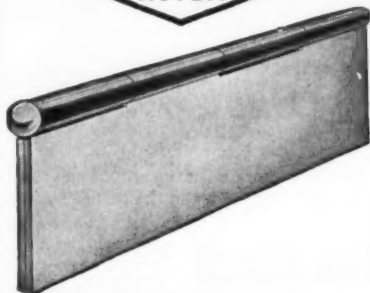
**VOGEL TOOL AND DIE  
CORPORATION**

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Fillmore 5-0160

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## CONTINUOUS HINGES

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& MFG. CO.**

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CHICAGO 19

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DO PRODUCTION  
MARKING JOBS

**SAFELY  
AND  
FAST**

**Fast**  
TYPE CHANGE  
FEATURE



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### STEEL TYPE HOLDER

Ideal for use on marking jobs requiring interchangeable type, this unit features a patented Safety Snap for speed and ease in changing type. Made to order in any size, it is made of Mecco Safety Steel to prevent spalling and mushrooming.

**M.E. CUNNINGHAM CO.**

1051 CHATEAU STREET, PITTSBURGH 33, PA.

For more data circle 526 on Reader Service Card  
May, 1955

## STANDARDIZED UNIVERSAL INDEX PLUNGERS

save time  
save money



Save the time and expense of designing and machining special plungers for multi-station tools with Universal Index Plungers. They greatly simplify jig and fixture manufacture because plunger body and bushing have same diameter — all holes can be bored with same tool, often in same setting. Soft pin knob, hardened and ground locating bushing, plunger and plunger bushing. Straight and Taper Plungers in standard sizes, complete, ready for installation at approximately  $\frac{1}{4}$  the cost of specially made plungers.

**UNIVERSAL  
ENGINEERING CO.**

FRANKENMUTH 9, MICHIGAN

169-B

For more data circle 527 on Reader Service Card  
modern machine shop 301

**new shop equipment . . .**

recharged with TL-131. No formaldehyde or bactericides are required before the coolant is placed in a machine.

The cutting fluid is all chemical in composition and does not contain any fats or vegetable matter in which bacteria may breed. TL-131 is supplied in

a concentrated form and is designed to be diluted 40 to 1 with water.

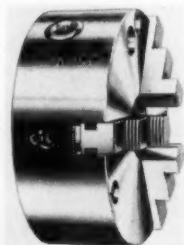
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★ ★ ★

**CHUCK PERMITS PRECISE  
CENTERING OF WORKPIECE**

Designated as the "Cent-R-Quik," a three-jaw universal scroll chuck which

is designed to permit precise centering of the workpiece to less than 0.0005 inch total indicator reading has been announced by The Skinner Chuck Co., 210 Edgewood Ave., New Britain, Conn. The chuck incorporates a single-point fast - adjustment feature that will not shift even under the heaviest cuts. Any number of duplicate parts, it is claimed, can be chucked accurately without making readjustments.



Skinner "Cent-R-Quik" 3-Jaw Adjustable Scroll Chuck

**YESTERDAY'S PIONEER . . . TODAY'S LEADER**

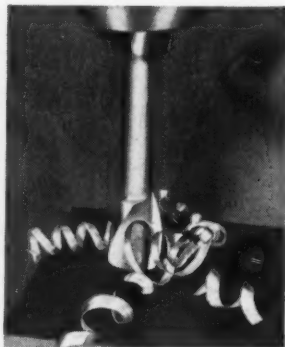
**WELDON "TU-LIP"  
COUNTERBORES**

**For FAST, FREE  
CUTTING**



As the name implies, WELDON "Tu-Lip" counterbores have only two cutting lips or flutes. This feature, together with the fast spiral, makes the "Tu-Lip" the fastest, freest cutting counterbore on the market.

Breakage due to clogging is prevented because this improved cutting tool provides more than ample chip room. Furnished singly in sizes desired or in convenient wood block sets as illustrated.



Weldon distributors throughout U. S. A. and Canada  
carry complete stocks to serve you.

**WRITE FOR LATEST CATALOG NO. 10.**

**THE WELDON TOOL CO.** *Cleveland 4, Ohio*



**3000 WOODHILL ROAD**

For more data circle 528 on Reader Service Card





## Why SCHNORR Disc Springs?

### Because:

1. Unlimited life within borders of permissible loads.
2. No creeping, initial settling or gradual fatigue.
3. Axial center pressure.
4. Exact adjustment to the desired pressure.
5. Small constructional height, large deflection.
6. Large inherent damping.
7. Large impact damping especially with multiple stacking.
8. Excellent space disposition.
9. Spring pressure, Spring length and Spring deflection can be easily determined for the same Spring size or can be changed by lengthening or shortening of the Spring columns or by multiple stacking. In special cases the character line can be made to divert from its usual straight form by diversified stacking.
10. Most Spring sizes available from stock.

• For descriptive literature write

**KARL A. NEISE**

Mastertools for Modernized Machining  
404 4TH AVE., Dept. MMS, NEW YORK 16, N. Y.

For more data circle 529 on Reader Service Card

BOYAR-SCHULTZ

*Precision-made*  
ALLOY STEEL

## T-SLOT BOLTS



For MAXIMUM EFFICIENCY  
and PROLONGED MACHINE LIFE

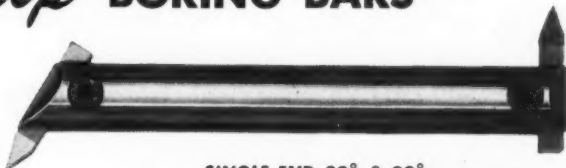
ACCURACY of costly machine tools may be ruined using ordinary bolts of soft steel. It is low cost insurance to use Boyar-Schultz precision made T-Slot bolts. Made from heat treated, Alloy steel, heads machined at right angle to shank, to present a broad, flat surface to upper surface of T-slots. Class 3 threads do not strip or distort. For best results use Special Nuts and Washers.

**BOYAR-SCHULTZ CORPORATION**

2020 SOUTH 25TH AVE., DEPT. F-B, BROADVIEW, ILL.

For more data circle 530 on Reader Service Card

# Shuregrip BORING BARS



### DOUBLE END 30° & 90°

Number	1-A	2-A	3-A	4-A	5-A	6-A	7-A
Bar. Dia. in	3/8	1/2	3/4	1	1 1/4	1 1/2	1 3/4
Length in	7	8	9	11	13	18	23
Cutter In	1/8 Rd.	1/8 Rd.	1/8 Sq.	1/4 Sq.	1/2 Sq.	3/4 Sq.	1 1/2 Sq.
Price Each	1.95	2.10	2.95	3.25	4.55	10.75	20.80

Adjustable Boring Bar holders available take bars from 3/8" up to 1 1/2" diameter. T-Blocks made to fit any lathe. Price list on request.

**WRITE FOR PRICE  
ON LARGER BARS**

### SINGLE END 30° & 90°

		When Ordering—State Angle Required					
Number	1-B	2-B	3-B	4-B	5-B	6-B	
Bar. Dia. in	3/8	1/2	3/4	1	1 1/4	1 1/2	1 3/4
Length in	3	4	5	7	8	10	
Cutter In	1/8 Rd.	1/8 Rd.	1/8 Sq.	1/4 Sq.	1/2 Sq.	3/4 Sq.	1 1/2 Sq.
Price Each	1.25	1.35	2.20	2.50	2.60	2.80	

### BREAK OFF ON SCORE, AS REQUIRED

1-6" Length—1/8 Dia. H.S.S. Tool Bit Stock—Hardened—each	95¢
1-6" Length—1/4 Dia. H.S.S. Tool Bit Stock—Hardened—each	\$1.05
Round Tool Bits Furnished in 1-A, 2-A, 1-B and 2-B—All Others Square. 1 Hexagon Wrench Furnished with Each Bar.	
Price of Square H.S.S. Cutter Bits.	1/8 x 1 1/4 1/4 x 1 1/2 1/2 x 1 1/2 3/4 x 1 1/2
	70 30 40 65

**J. E. FREYMAN & SONS, INC.**

3627 KESWICK RD.

BALTIMORE 11, MD.

For more data circle 531 on Reader Service Card

## new shop equipment . . .

Since all adjusting is done internally, there is no movement of the chuck body in relation to the machine spindle; therefore, the chuck is always in close balance. The precision jaw-adjusting feature and the wide workholding range of the chuck jaws are said to eliminate the need for collets and

also stepped collets. The chuck is securely mounted on the machine spindle in the conventional manner.

For more data circle 101 on Reader Service Card

★ ★ ★

## DRILL HEAD HAS FULL BALL BEARING CONSTRUCTION

A double eccentric adjustable drill head which features full ball bearing

construction as standard has been announced by Thriftmaster Products Corp., 1034 N. Plum St., Lancaster, Pa. The spindles of the head have a very large range of adjustment and may be set to drill irregular hole patterns.

All the spindles are provided with vertical or depth adjustment and are held rigid by means of a unique



\*TRADE MARK



### New! —SAVE TIME!

These 6 brand-new Midget Air Clamp cylinders with adjustable strokes variable from  $\frac{1}{4}$ " to 3" can be used where longer strokes are needed and stroke can be "tuned" to exact length wanted even after setup is made!



### New! —SAVE AIR!

You can save air in large fixtures where dozens or hundreds of "Midgets" are used by adjusting stroke with special spanner wrench furnished with cylinder.



### New! —SAVE SPACE & MONEY!

The "nose" on each "Midget" also telescopes into barrel reducing stroke and overall length to save space in cramped quarters!

Each Mead "Midget" is guaranteed to give you millions of trouble-free cycles—to be a better value, dollar for dollar, than any comparable cylinder.

Priced so low you can almost forget it!

Actual overall height vertical models:  
3 $\frac{1}{2}$ "  
4 $\frac{1}{2}$ "  
5 $\frac{1}{2}$ "



"MORE per hour with Mead Air Power"

PATHFINDER IN AIR POWER AUTOMATION

Write Factory or Nearest Mead Man For Bulletin AA-55 (See Index Thomas' Register for address, phone).



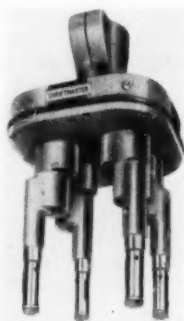
# MEAD

SPECIALTIES COMPANY

4114 N. Knox Ave., DEPT. AA-55  
CHICAGO 41, ILLINOIS



Actual overall length horizontal models:  
3 $\frac{1}{2}$ ", 5", 6".



Thriftmaster Full Ball Bearing Double Eccentric Drill Head

For more data circle 532 on Reader Service Card

# NEW LEITZ

## TOOLMAKER MICROSCOPE

...PRODUCES HIGHEST PRECISION  
...CUTS INSPECTION TIME

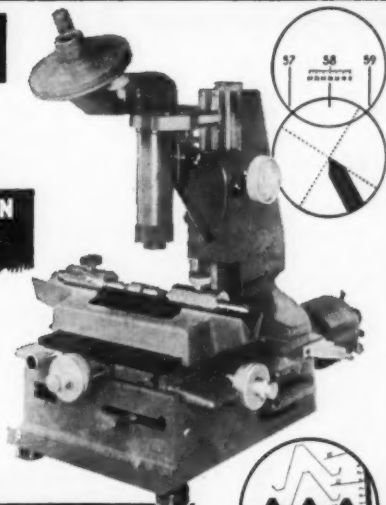
The NEW LEITZ DESIGN checks angular measurements in degrees and minutes.

Contains all Thread Templates for U.S. National thread profiles 6-80 pitch.

Contains Radial Templates from  $21/64"$  to  $13/16"$  by  $1/64"$ . Concentric circles from  $.010"$  to  $.280"$  by  $.010"$  and one blank compartment.

NOTE: TEMPLATES CAN BE OBSERVED IN 3 MAGNIFICATIONS: 10X - 20X - 30X

BE SAFE — SEND FOR LATEST BULLETINS



### Geo. SCHERR OPTICAL TOOLS, Inc.

200-MM LAFAYETTE STREET • NEW YORK 12, N. Y.

For more data circle 533 on Reader Service Card

# TEMCO

## ELECTRIC FURNACES for production line heat treating and heavy-demand process control



More and more plants are selecting highly efficient TEMCO electric furnaces for heat treating dies, parts, tools, etc. and industrial lab work. Series 1700 shown is one of eight convenient sizes . . . with either fully automatic or manual controls. Easy to install and operate . . . economical. \$55 to \$507.

Write for data and nearest dealer's name.

THERMO ELECTRIC MANUFACTURING CO. • 488 HUFF ST., DUBUQUE, IOWA

For more data circle 534 on Reader Service Card

**new shop equipment . . .**

clamping device which is said to prevent damage to the head by excessive tightening. The clamping device also permits operation with or without spindle locating templates.

According to the manufacturer, maximum rigidity and accuracy during drilling operations are inherent as

there is no offset unsupported thrust load. Wide faced stub tooth gears provide maximum strength and quiet operation. The head is completely sealed against oil leakage or dust penetration and may be operated vertically, horizontally or inverted. The drill head is available in 20 standard models with 3, 4, 6 or 8 spindles, having drilling capacities up to 1½-inch diameter holes in steel. The head can be used



**"BEST \$1286 WE  
EVER SPENT!"**

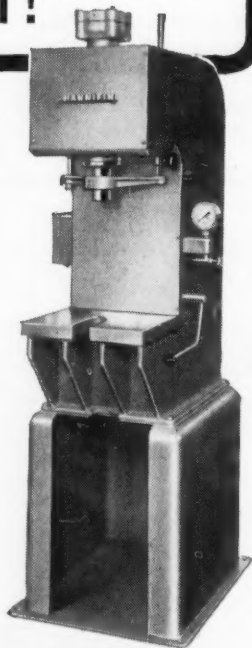
**That's the price of this  
5-Ton HANNIFIN Press\***

A lot of production men have made such comments about this versatile little hydraulic press.

They like the way you can adjust it to the exact force you need for each job, all the way from 1 ton to 5 tons. The backstroke is adjustable, too, so the ram just clears the work on any job. Fast-acting controls. Prompt delivery from stock.

**WRITE.** Complete information and prices on the Hannifin line of 1- to 10-ton Hydraulic Presses will be sent on request.

\*Price complete with motor and starter F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.

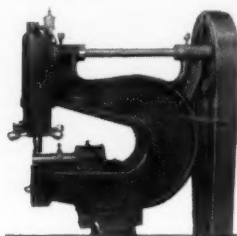


**HANNIFIN**

**Hannifin Corporation, 565 S. Wolf Road, Des Plaines, Illinois**

For more data circle 535 on Reader Service Card

## SAVAGE NIBBLING MACHINES



**NOW  
TUBE CUTTING  
ATTACHMENTS  
for  
ANY SIZE SAVAGE  
NIBBLING  
MACHINE**

For slotting, cutting off and forming special ends. Cutting by guide lines or template.

Capacity in tube wall thickness to one half rated capacity of Nibbler.  
Tube sizes from 1" I.D. to 3½ O.D. Larger diameters for lighter gauges.

Quotation on Request

**"NIBBLE YOUR COSTS"**

**W. J. SAVAGE COMPANY**  
Knoxville Since 1885 Tennessee

**PIONEER MFRS. OF NIBBLING MACHINES**

For more data circle 536 on Reader Service Card



**"OLIVER"  
Jig Saws  
cut costs**



**Cut non-ferrous metals and  
plastics quickly, accurately**

Upper tension unit mounted on ceiling for unlimited capacity. Table is 72" or 34" square. Vari-speed drive gives 650 to 1300 strokes a minute. Cuts non-ferrous metals, materials smoothly, rapidly. Write for Bulletin 173-S.

**OLIVER MACHINERY COMPANY**

GRAND RAPIDS 2, MICH.

For more data circle 537 on Reader Service Card

**Get More Tool and Cutter Grinding  
Capacity at Lower Cost with...**

## the **NEW STERLING Model "RK-2"**

All types of cutting tools from single point lathe tools to 22" diameter saws can be ground quickly and accurately on this completely new Tool & Cutter Grinder. Eliminating heavy, expensive anti-friction tables provides greater stability, better accuracy and increased capacity at LOWER COST.

The compact design puts all controls in easy reach of the operator—set-ups take less time... the floating spindle moves so easily that operator fatigue is cut to a minimum. Standard equipment includes centers with 11" swing, and 14" between centers.

You get more capacity for grinding tools and cutters at about ½ the cost of a Universal Tool & Cutter Grinder with the new Sterling Model "RK-2".

Write TODAY for illustrated bulletin RK-2.



**McDONOUGH MFG. CO.** 1521 Galloway  
Eau Claire, Wisc.

For more data circle 538 on Reader Service Card

**new shop equipment . . .**

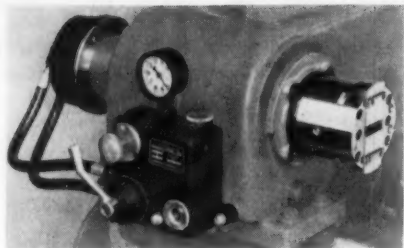
for drilling, reaming, tapping or boring and can be arranged to fit any conventional drilling machine.

For more data circle 102 on Reader Service Card

★ ★ ★

**AIR CHUCK IS DESIGNED FOR  
PRECISION CHUCKING**

Designated as the Model 5000, an air chuck for precision chucking of high-speed heavy-duty production work has been announced by Wright Tool Co., 223 S. Hindry Ave., Inglewood, Calif. Said to be highly versatile and double acting for internal and external holding, the chuck fits all stand-



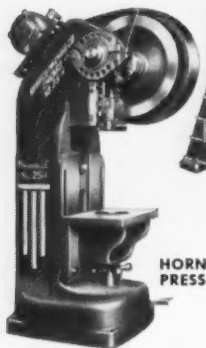
Wright Model 5000 Air Chuck installed on lathe

ard spindles without the need for adapter plates. The compact, lightweight design of the chuck provides for minimum flywheel action, thus affording fast starting, stopping and reversing. According to the manufacturer, the chuck holds concentricity tolerances to 0.0005 inch.

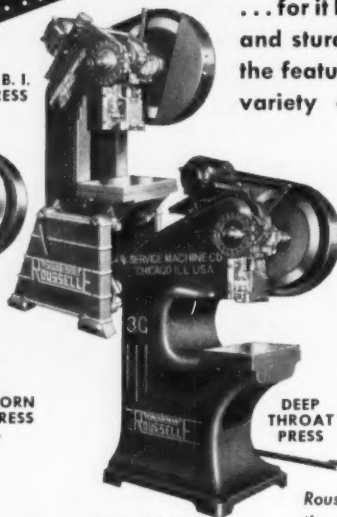
**You take  
no chances  
when you  
choose . . . . .**

**ROUSSELLE**

O. B. I.  
PRESS



HORN  
PRESS



DEEP  
THROAT  
PRESS

**. . . for it has the speed, accuracy and sturdiness you want — also the features to handle a greater variety of work — along with**

**simpler, more thrifty operation and maintenance... Dollar for dollar you cannot buy a better, more practical press.**

**Significant savings are often achieved if you let our engineering staff assist you. There is no obligation.**

*Rousselle Presses are sold exclusively through Leading Machinery Dealers*

Rousselle Presses are manufactured by

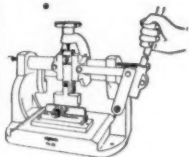
**SERVICE MACHINE CO. 2310 West 78th Street • Chicago 20, Ill.**

For more data circle 539 on Reader Service Card



## Marking Machines

- For every kind of marking
- Hand and power models
- Mark steel, other metal



and plastic products.

The ACROMARK SERIES 9A Machine shown at left will mark anything you make.

It's lowest in price and highest in quality. It comes in hand, motor and air driven models.

Write for complete details.

**the ACROMARK Company**

9 MORRELL ST., ELIZABETH 4, N. J.

For more data circle 540 on Reader Service Card

Best Check for  
Parallelism...  
Squareness...  
Angles...

Perkin-Elmer's Optical

## ANGLE COMPARATOR



Simplifies and speeds inspection of parts, even those difficult to approach. • Measurements read directly from graduated reticle. • Operates entirely on optical principles—no physical contact with part required—precision is independent of the operator.

For descriptive booklet write:  
The Perkin-Elmer Corporation, 885 Main Avenue, Norwalk, Conn.

**PERKIN ELMER**

*Optical Tooling for the Modernized Machine Shop*

For more data circle 541 on Reader Service Card

## "MULTI-INSULATION"

is the secret of . . .

## HUPPERT

### Floor Model Furnaces

These sturdy production type Huppert electric furnaces not only attain highest efficiency, but also cut operating costs to a minimum through the unique Huppert method of using multi-insulation surrounding all sides of the heating chamber. Heat range—continuous up to 1850° F.,

intermittent operation to 1950° F., can also be built for 2300° F. operation.

This furnace comes complete with an indicating electronic temperature controller, and a tight seating, wedge-type door is used. Standardly furnished for 220 V. AC single or 3 phase operation. (110 V. or 440 V. models to order).

This model built in 20 different sizes.

Model No. 16 illustrated—12" x 8" x 18"—\$975.00 complete

Write for literature on complete line of Huppert furnaces and ovens.

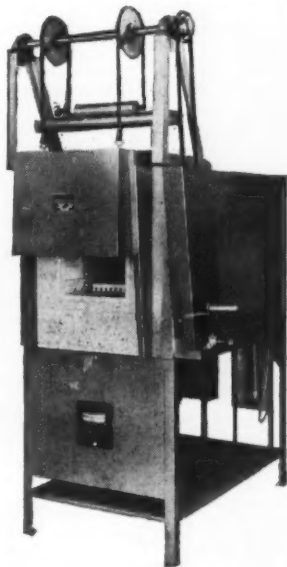
## K. H. HUPPERT CO.

6841 Cottage Grove Avenue

Chicago 37, Illinois

Manufacturers of Electric Furnaces and Ovens

For more data circle 542 on Reader Service Card



## new shop equipment . . .

The Model 5000 is supplied complete with air hoses and fittings, power cylinder, and control unit combining moisture trap, pressure regulator and gage, lubricator and four-way valve. The chuck is made of fine alloy steels, heat treated and precision ground. It is available for use on all standard

spindles of the smaller lathes, as well as Landis grinders and multiple-spindle automatics.

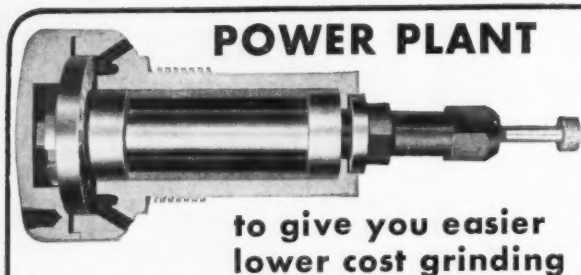
For more data circle 103 on Reader Service Card

★ ★ ★

## MICROMETER OFFSET BORING HEADS

Flynn Mfg. Co., 133 Flowerdale Ave., Detroit 20, Mich., has announced

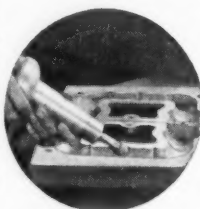
a major change in its former No. 6 and No. 7 Micrometer Offset Boring Heads. Formerly, load was placed on the tool block by the end of the shank. When the shank was screwed down sufficiently to produce the proper load on the block, it was locked in position by turning down a threaded locking ring. When the user changed shanks, this procedure was carried out, and frequently, it is



## POWER PLANT

to give you easier  
lower cost grinding

Use an Onsrud Air Turbine Grinder just once, and you'll never want any other kind. High efficiency turbine keeps grinding wheel turning full speed under load. No annoying RPM slow-up to slow-up your work. High air turbine speed lets you use low cost, small diameter wheels . . . give right speed for fast work. Always runs cool . . . light in weight. Grease packed bearings save on tool maintenance.



For information . . . write for free Onsrud Grinder Bulletin 1129

## ONSRUD MACHINE WORKS, Inc.

3924 Palmer Street • Chicago 47, Illinois  
Portable Tool Representatives Wanted . . .  
Good Territories Available.



B-1B  
AIR TURBINE  
GRINDER  
75,000 RPM

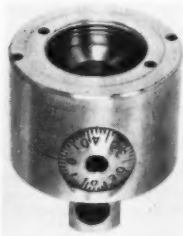
D-1A  
AIR TURBINE  
GRINDER  
50,000 RPM

E-1A  
AIR TURBINE  
GRINDER  
38,000 RPM



America's leading  
AIR TURBINE TOOLS

For more data circle 543 on Reader Service Card



Flynn Improved  
Micrometer Offset  
Boring Head

## NON-ROTATING DRILL STOP for Precision Hole Depth Control



Now you can be certain of positive control of hole depth with the WOHLNIP Precision Drill Stop . . . which is Non-Rotating. Will not mar, mark or damage the face of the work, fixture or bushing. Completely automatic, the WOHLNIP Drill Stop reduces human errors, simplifies difficult jobs, lowers machining cost, increases production and accuracy, eliminating rejects. Used for drilling, center drilling, countersinking, boring, milling, routing, reaming. Used on drill presses, radial drills, milling machines, lathes, turret lathes, hand and automatic screw machines. Available as shown and with standard straight and taper shanks for any size needed.

(Patent Pending)

Write for Free Folder with Illustrations and Prices

EXCLUSIVE DISTRIBUTORS WANTED

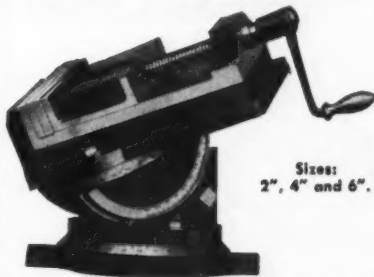
**WOHLNIP PRODUCTS, INC.**

634 Central Avenue

East Orange, N. J.

For more data circle 544 on Reader Service Card

## TOOLMAKERS!



Sizes:  
2", 4" and 6".

## NOW SET-UP FASTER--

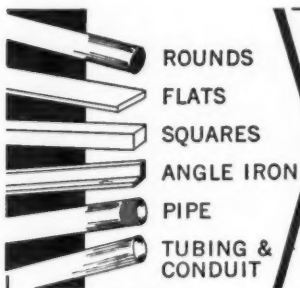
Save time on intricate, angular set-ups with the fully universal MASTER MULTI-SWIVEL VISE. Three swivels instantly set any compound angle. Used worldwide. Interchangeable platens optional.

Write for Circular

**DONOVAN MFG. CO.**

80 BATTERYMARCH ST., BOSTON 10, MASS.

For more data circle 545 on Reader Service Card



ROUNDS

FLATS

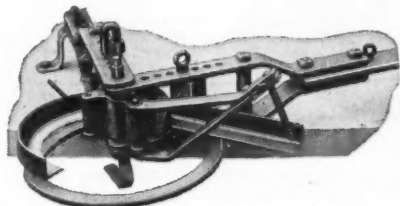
SQUARES

ANGLE IRON

PIPE

TUBING &  
CONDUIT

One man bends all these on one machine . . .  
the **HOSSFELD UNIVERSAL® IRON BENDER**



Wrenchless, the Hossfeld Bender is always ready for use. It's easily and quickly set up for the 101 different bends needed every day in maintenance and production work. Adaptable, it replaces special bending equipment. For those hard-to-pull bends on heavier material, a Hydraulic Attachment (optional) enables one man to do the job.

### GET THE FACTS!

Write for bulletin showing bender models, standard and special dies, and illustrations of bar, angle iron and pipe bends.

**HOSSFELD MFG. CO.**

402 W. 3rd St.  
Winona, Minn.



For more data circle 546 on Reader Service Card

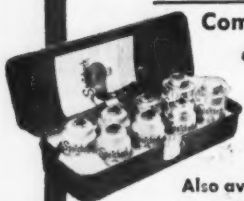
**Just Spray It On  
to Find Cracks**



# Spotcheck®

**THE IMPROVED  
DYE PENETRANT  
INSPECTION**

**Does the Job  
Easier!**



**Complete SK-1 Kit  
only \$3500**

Plus \$1.00 packing  
and shipping,  
shipped prepaid  
Prices apply in con-  
tinental U.S. only.

Also available in bulk cans  
at lowest prices.

**MAGNAFLUX CORPORATION**  
7323 West Ainslie Avenue  
Chicago 31, Illinois



Please send us  
Quantity

- ..... SK-1 Kit(s) @ \$35.00 ea.,  
plus \$1.00 ea., shipping and handling
- ☐ Check enclosed, Amount \$.....
- ☐ Send on our P. O. Number.....
- ☐ Send only Free Illustrated Bulletin now

Name..... Title.....

Company.....

Address.....

City..... Zone... State.....

For more data circle 547 on Reader Service Card

**new shop equipment . . .**

claimed, too much or too little pressure was applied to the block.

The new design provides for permanent preloading of the tool block. A cup-type backplate is screwed into the head at the factory, applying the proper pressure on the tool block and is locked in position by a locking ring. The shank turns into the threaded backplate and may be changed at any time without disturbing the load on the block. Simplified interchange of shanks is claimed to make it possible for shops to order heads only, the shanks being interchangeable. The improved heads are designated as the Nos. 6-B and 7-B and are designed to utilize Flynn 150 Series shanks and arbors.

For more data circle 104 on Reader Service Card

★ ★ ★

## **SELF-PROPELLED LIFTER HAS CAPACITY OF 1,000 POUNDS**

A self-propelled lifter, designated as the "Walkie-Worklifter," has been



**Economy Self-Propelled "Walkie-Worklifter"**  
designed for medium-duty service



## ETALON No. 9

**\$40.00**

F.O.B., N.Y.

**HARDENED STAINLESS STEEL** Overall Length 12"  
Measuring Capacity  $8\frac{1}{2}$ "

World famous for accuracy. Hand fitted Vernier slide insures smooth, snug operation. Wide Vernier, exceptionally easy to read. English or English and Metric graduations. LENGTH UP TO FIFTEEN FEET. Fully guaranteed. Handsome, form-fitting wooden case.

Ask Your Dealer or Write

**ALINA CORPORATION**

401 BROADWAY  
NEW YORK 13, N. Y.

For more data circle 548 on Reader Service Card

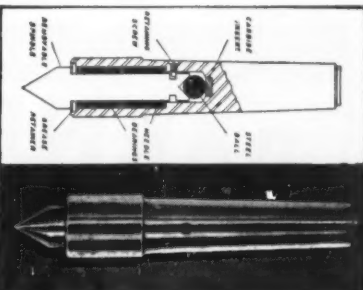
**Its accuracy is built-in**

### WEE LIVE CENTERS

Extra capacity, needle bearings plus short overhang—30 to 40% less—makes the Wee more rigid and accurate under heavy cutting loads. Runout held to .00015. Test one—your money back if center does not prove its worth in 24-day trial. No. 2, M.T., \$21.00. No. 3, M.T., \$24.00. Request complete price list, many sizes, tapers, shanks.

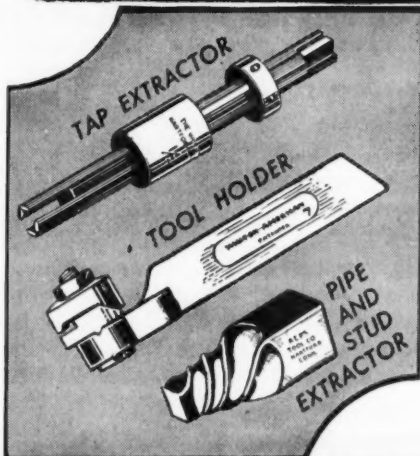
Write direct, if distributor cannot supply you.

**HERBERT CROSS & SON, Bala-Cynwyd 1, Pa.**



For more data circle 549 on Reader Service Card

## WALTON SPECIALIZED TOOLS CUT COSTS IN METAL WORKING



### TAP EXTENSIONS Added to the WALTON Line of Labor Saving Tools

WALTON TAP EXTENSIONS are valuable for tapping in places where it is difficult or impossible, because of limited space, to turn a tap wrench. Fit all standard taps (4-flute, 3-flute, and 2-flute styles) sizes from  $\frac{3}{16}$ " to 1" inclusive. Made of special alloy, heat-treated steel.

Write for Catalog 10. Free trial offer.

## THE WALTON COMPANY, Hartford 10, Conn.

For more data circle 550 on Reader Service Card

**new shop equipment . . .**

introduced by Economy Engineering Co., 4507 W. Lake St., Chicago 24, Ill. According to the manufacturer, the Walkie-Worklifter has a lifting capacity of 1,000 pounds and is designed for light and medium-duty service. It is available in many models, including a straddle base type, with a lifting

range of 108 inches. Standard platform models are available with lifting ranges up to 110 inches.

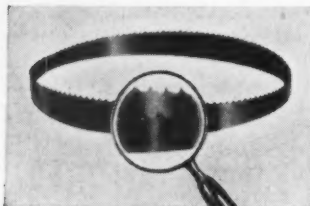
For more data circle 105 on Reader Service Card

★ ★ ★

**JIG BORER FEATURES STEPLESS  
MAGNETIC POWER CONTROL**

Engineering & Commerce, 9717 Eckford Ave., Ozone Park 17, N. Y., has

announced the Schroeder "Universal" No. 2 Production Jig Borer which features stepless magnetic power control. According to the manufacturer, the magnetic control provides drive with stepless and loose free speed variations at constant torque over a full speed range from 80 to 2,000 r.p.m. in either direction of rotation. The machine incorporates a 4½-h.p. main driving motor and is said to be capable of drilling up to 1 inch in diameter in solid steel. Maximum boring capacity is 10 inches. The distance from the table top to the spindle end is 20 inches, and from the center of the spindle to the column measures 12¼ inches. Spin-



Barnes Welded Band Saws in ARC LINE; Raker and Wavy Set and Barnes SKIP TOOTH



**W. O. BARNES CO., INC.**  
1288 TERMINAL AVE., DETROIT 12, MICH.

**LOOK  
AT THESE  
BARNES**

*Features...*

- Special equipment assures perfect welds.
- Controlled anneal provides flexibility and strength.
- Consistent quality—rigid inspection.
- Tailor-made to exact length—NO SCRAP.
- Prompt delivery from local Distributor's stock.

For more data circle 551 on Reader Service Card





## THIS FILE SETTING SQUARE

Puts the ALL AMERICAN  
Precision Filing Machine  
IN A CLASS BY ITSELF!

Crooked, bent, curved  
file shanks present no prob-  
lem for this machine. Pat-  
ented universal joint file  
clamp and file setting square  
assure true and vertical  
position of file or  
other tool in a mat-  
ter of seconds.

Hones and saws too.

Neoprene bellows

keeps dirt and

chips out of oil-

filled housing and

supplies air to chip

blower. Two overarms—one to hold top

of hones and saws—the other to back up file or

hone or to guide saw. Highly accurate. Time-

saving. Send for literature.

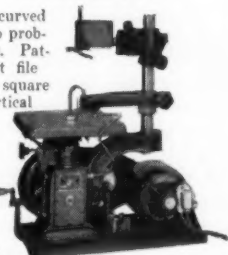
Manufacturers of  
All American Vibration Fatigue Test Machines



**ALL AMERICAN**  
Tool & Manufacturing Co.

8043 Lawndale Avenue, Skokie, Ill.

For more data circle 552 on Reader Service Card



Save your large  
**JIG BORERS**  
for large jobs...  
put small  
precision work  
on the

**LINLEY**

The Linley Jig Borer pro-  
vides the means . . . at  
very low cost . . . of hand-  
ling your most exacting  
requirements in precision.  
With it you can cut costs  
through having a tool ex-  
actly fitted to your small  
work . . . save your larger  
machines for larger work.



### Specifications

Table Movement:  
6" x 10"

Table Size:  
7" x 17½"

Send for complete information TODAY!

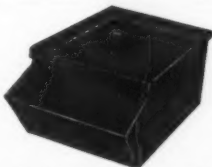
**LINLEY BROTHERS CO.**

661 STATE ST. EXT., BRIDGEPORT 1, CONN.

For more data circle 553 on Reader Service Card



"Stack Up"



Sterling Bin Front "Top Rim"  
Steel Stacking Box.  
Size: 18" x 12" x 6".

## THESE BOXES AGAINST ANY!

Once you use and compare Sterling stacking boxes,  
you'll know why we invite comparison in design,  
construction, and price. Our "Top Rim" construc-  
tion provides stronger support all around the box  
... no corner inserts to become loose and fall out.  
Efficiency in designing and manufacturing allows  
us to quote favorably on any type or size stack-  
ing box.

Write for literature and prices.

Sterling Factory Equipment Co., 183 Charles St., Providence, R. I.

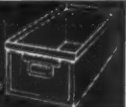


Sterling "Top Rim" Steel Stack-  
ing Box with drop handles.  
Size: 18" x 12" x 6".



**Sterling**

Quality Handling & Storage Equipment



For more data circle 554 on Reader Service Card

May, 1955

modern machine shop 315

Only

## THRIFTMASTER Universal Joint Type DRILL HEADS

have these exclusive\* features

\*Standard Full Ball Bearing Construction, including Spindles

Driving assembly is Full Ball Bearing mounted with 3 Bearings on each spindle. Thrust load carried by radial thrust bearings.



\*Standard Slip-On and Slip-Off Template Construction

For accurate setting and locating spindle brackets are machined to receive slip-on and slip-off template.

**6 Standard Models . . .**

Models U-608 and U-1000—Ball Bearing

Models U-620B and U-1012B—Plain Bearing,  
1 1/16" or 1/2" min. centers

Models U-608-BS and U-1000-BS—Ball Bearing Gear Case, Plain Spindles

**Semi-Standard Heavy Duty Full Ball Bearing . . .**

1/2" in Cast Iron—1-7/16" min. centers  
7-1/8" or 9-3/4" Dia.

1/2" in Steel—1-13/16" min. centers  
7" or 9-5/8" Dia.

**Also Larger Adaptations and Full Line of Fixed Center Drill Heads.**

WRITE FOR FULL INFORMATION



Subsidiary of  
Thomson Industries, Inc.

**THRIFTMASTER** Products Corporation

1034 N. PLUM STREET  
LANCASTER, PA.

Also Makers of

**DORMAN AUTOMATIC REVERSE TAPPERS**

For more data circle 555 on Reader Service Card

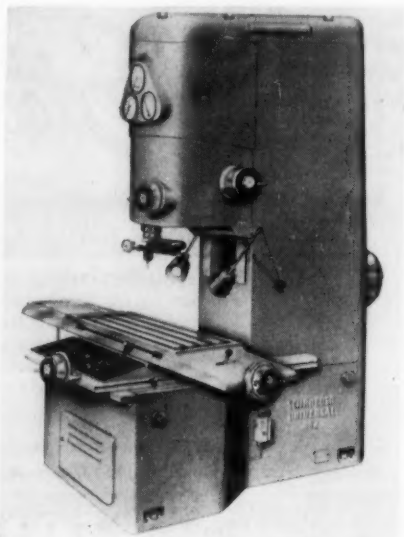
316 modern machine shop

new shop equipment . . .

dle quill travel is claimed to be 5 inches.

The machine base and column are heavy and strongly ribbed, and all castings are seasoned, having a hardness of at least 350 Brinell. All surfaces are scraped or ground to within a tolerance of 0.0001 inch. The spindle is equipped with ultra-precision ball bearings, lubricated for life, and an electric-automatic quick-acting brake. The table spindles are carefully protected against coolants, dust, dirt and chips.

The entire electrical control of the machine is supervised by a single master control switch having only three switching positions. A packaged draw-out type chassis housing the entire magnetic amplifier and all other electric elements of the machine is pushed



Schroeder "Universal" No. 2 Production Jig Borer with stepless magnetic power control

May, 1955

# RUST-LICK

IN  
AQUEOUS SYSTEMS

## RUST-LICK "B"

For use wherever water comes  
in contact with Ferrous Metal.

### STOPS RUST IN

Hydrostatic-Pressure Testing  
Cleaning and Washing  
Heat-Treating  
Grinding Operations  
Additive to Soluble Oils

### ELIMINATES:

Fire Hazards • Toxicity  
Dermatitis • Degreasing

Write for free sample and brochure.

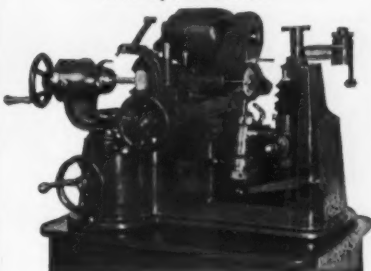
PRODUCTION SPECIALTIES, INC.

755 BOYLSTON STREET  
BOSTON 16, MASS.

For more data circle 556 on Reader Service Card

## HYBCO TAP GRINDER

Sharpens Chamfers, Flutes  
and Spiral Points



MODEL 1100

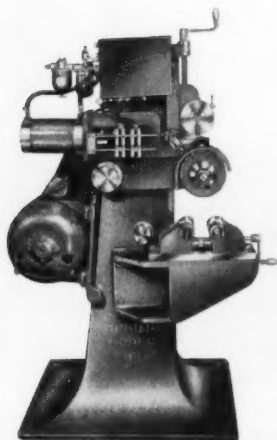
- Capacities No. 0 Machine Screw to  
1 1/2" Hand Taps.

**HENRY P. BOGGIS & CO.**

708 E. 163rd St., Cleveland 10, Ohio

For more data circle 557 on Reader Service Card

**NOW! CUT UP TO 1,000 PIECES  
OF PIPE PER HOUR . . .**



## CONTINENTAL CUT-OFF MACHINES

Cut Pipes and Tubes faster with Continental  
High Speed Cut-Off Machines. Lowest main-  
tenance means less cost to you. 3/8" to 12 3/4"  
O.D. capacities, hand or automatic air-oper-  
ated bench and floor models. Request free  
catalog.

*Continental* MACHINE CO.

SINCE 1919

1952 N. MAUD AVE. • CHICAGO 14, ILL.

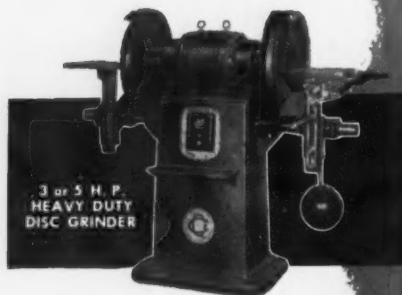
For more data circle 558 on Reader Service Card

May, 1955

modern machine shop 317

**"Time Savers  
in any shop"**

**QUEEN CITY  
heavy duty  
DISC GRINDERS  
and BUFFERS**



Queen City Heavy Duty Disc Grinders and Buffers are designed for the hardest use. Extra heavy spindle, large, high quality ball bearings and special duty motors all contribute to long, trouble-free service.

The complete range of Queen City Grinders and Buffers . . . floor and bench types . . . in sizes from  $\frac{1}{2}$  to 10 H. P. . . . is described in a free 24-page catalog.

*Write for detailed literature*

**QUEEN CITY  
MACHINE TOOL CO.**

QUEEN CITY  
MACHINE TOOL CO.  
3911 Kellogg Avenue,  
Cincinnati 26, Ohio

**"Queen City Grinders—Famous For Over 50 Years"**

For more data circle 559 on Reader Service Card

318 modern machine shop

*new shop equipment . . .*

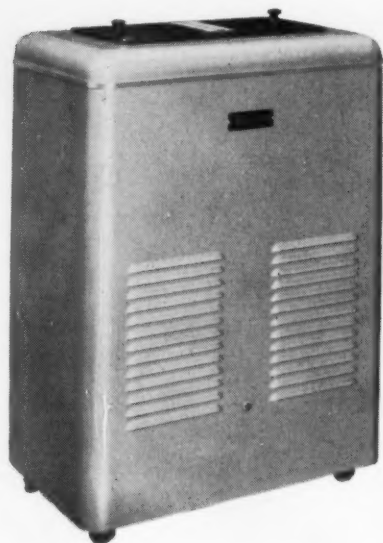
into the lower machine housing, facilitating easy inspection, service and maintenance.

For more data circle 106 on Reader Service Card

★ ★ ★

**LOW TEMPERATURE CHILLING  
UNIT FOR LOW VOLUME  
REQUIREMENTS**

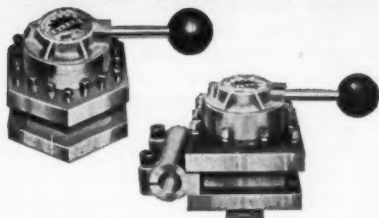
For research laboratories, testing and biological centers, heat treating laboratories, industrial test departments and similar chilling users whose volume requirements are low, Cincinnati Sub-Zero Products, 3930-S5 Reading Rd., Cincinnati 29, Ohio, has announced the Model XA 120-2 Low Temperature Chilling Machine. The 2 cubic-foot unit has a clear opening of  $21\frac{1}{2} \times 10\frac{1}{2}$



**Sub-Zero Model XA 120-2 Low Temperature  
Chilling Unit for low volume requirements**

May, 1955

## "WEDGE-LOCK" TURRET



Does not raise up when indexing in all 12 positions. 4-way and 6-way block models. Repetitive accuracy to within .0003 plus or minus within itself.

### WRITE FOR FOLDER

Makers of Combination Rotary Tables and Angle Plates. Also Helical Gear Speed Reducers, Single and Double Reduction. Also Special Gears of All Types.

Open territory available to representatives.

**OLSON INDUSTRIAL PRODUCTS, INC.**

40 W. WATER ST. • WAKEFIELD, MASS.

For more data circle 560 on Reader Service Card

## Adjustable Automatic Stock

**FEED STOP for DIES**

### Dahlstrom AUTOSTOP

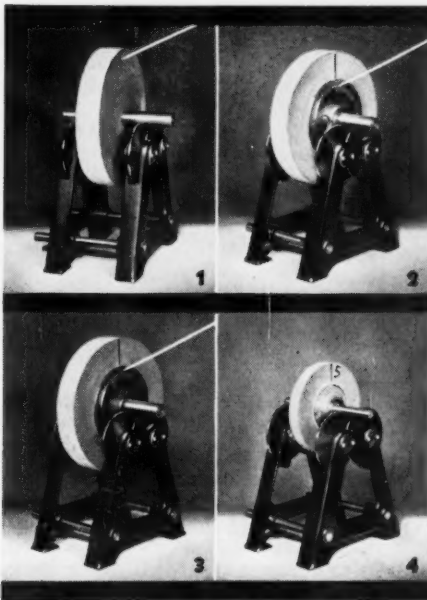
No drill jig . . .  
no slotting . . .  
no milling . . .  
Specify whether  
for use on blank-  
ing, progressive  
or compound dies.  
Mounts on  
stripper plate  
in 15 minutes.  
\$1.75 each;  
\$18 doz.

Write for pamphlet.

### BRANCH MFG. CO.

15 Olson Drive • North Branch, Minnesota

For more data circle 561 on Reader Service Card



## QUICK, EASY WAY TO BRING GRINDING, BUFFING, AND POLISHING WHEELS INTO BALANCE . . .

(1) Balance on Anderson super-sensitive Balancing Way and mark light side. (2) Line up mark with both zeros on Anderson Speedi-Balancer. (3) Turn both discs till wheel balances. (4) Record setting. Wheel is now prebalanced for instant use when needed: just use Speedi Balancer, set to number marked, as outside collar. Save time. Eliminate weights. Reduce vibration. Increase motor bearing life. Improve motor performance. For information on sizes, types, and prices of Anderson Balancing Ways and Speedi-Balancers, write for Bulletin 5-22.

### ANDERSON BROS. MFG. CO.

ROCKFORD, ILLINOIS

For more data circle 562 on Reader Service Card

**new shop equipment . . .**

inches. The chilling chamber size is 24 x 12 x 12 inches deep, and the overall size of the unit is 43 inches high x 32 inches long x 20 inches deep. According to the manufacturer, at minus 120 deg. F. with convection fluid, the machine has a capacity of 300 Btu's per hour.

The Model XA 120-2 has a hermetically sealed refrigeration system. The chilling chamber is made of electrically welded steel, hot-dip zinc coated. The cabinet is 16-gauge steel and is of one piece construction. Standard accessories available include a 500 watt heater to convert the machine for high and low temperature testing. This will give the machine a range from minus 120 to plus 200 deg. F. Other testing accessories include a fan for

rapid cooling or heating, observation windows in top or front, interior lights, entrance holes, electrical connections within the chamber and instrumentation as required.

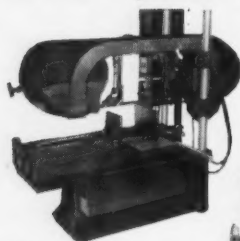
For more data circle 107 on Reader Service Card

★ ★ ★

**BACKSTAND  
CONVERTS  
GRINDER**

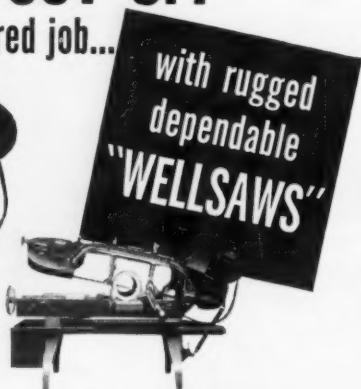
Designated as the Model 524, a bench type abrasive belt backstand which is said to be capable of quickly converting a grinder or polisher into a modern, fast cutting, time saving abrasive belt machine has been announced by Hammond Machinery Builders Inc., 1615 Douglas Ave., Kalamazoo, Mich. The backstand unit is de-

**METAL "CUT-OFF"**  
becomes a preferred job...



featuring . . .

- Easily Controlled Operation
- Fast, Accurate Action
- High Job Productivity
- Low Operating Cost
- Long, Dependable Service



• Production, or utility "cut-off" work in your shop becomes a *Preferred Job* with a Wells Horizontal Metal Cutting Band Saw, because the operation is so easy to control. Even in the hands of the "new guy," a Wells Band Saw can be counted on to *Reduce* your *Production Costs*, through greater efficiency, more accurate cutting and real dependable service.

Call your Wells Distributor, or write for *Job-Engineering Service*.



*The Pioneers of Horizontal*  
**METAL CUTTING  
BAND SAWS**  
WELLS MANUFACTURING CORPORATION  
808 TYLER ST. - THREE RIVERS, MICH.

For more data circle 563 on Reader Service Card



**JACO**LOW COST  
AUTOMATIC**STOCK REEL**COSTS NO MORE THAN  
STANDARD STOCK REELSPOWERED BY  
THE NATURAL  
SPRING OF  
UNCOILING STOCK

3 SIZES — ALL WILL TAKE 6" WIDE STOCK.

24" diameter \$85.00

30" diameter \$89.00

36" diameter \$95.00

Guaranteed — money back if not 100% satisfied

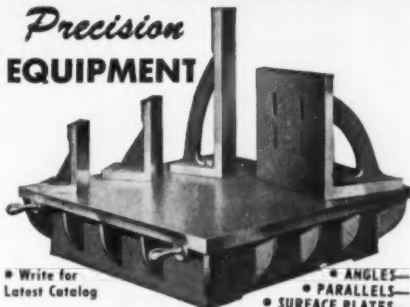
New LOW prices  
on the JACO  
3-inch and 6-inch  
SCRAP CHOPPERWRITE FOR FULL  
DETAILS TODAY!

Dealer Inquiries Invited

**JACO DEVICES, INC.**

98 HIGH ST., HINGHAM, MASS.

For more data circle 564 on Reader Service Card

**"MILWAUKEE"***Precision*  
**EQUIPMENT**• Write for  
Latest Catalog• ANGLES—  
• PARALLELS—  
• SURFACE PLATES—  
• STRAIGHT EDGES—Designed and finished for true dimensional  
accuracy—made from highest-grade semi-  
steel.J. C. BUSCH CO.,  
126 E. Pittsburgh Ave., Milwaukee 4, Wis.

SEND FREE your latest Catalog, to:

Name \_\_\_\_\_

Address \_\_\_\_\_

For more data circle 565 on Reader Service Card

**cut weld cleaning time by 85%**

Throw away your cold chisel and whisk off weld spatter with a dry rag! Protect-O-Metal spatter-proofing compounds make weld cleaning a breeze. Improve your welds at the same time . . . P-O-M compounds quiet the arc, improve fusion and electrode operation, prevent oxidation and annealing scale, cause no porosity. No smoke, odors, or fumes.

**P-O-M No. 2.** Non-inflammable, non-toxic, water-soluble paste. Inorganic. Thin before applying and start welding at once. \$3.25 per gallon, f.o.b. Dayton.

**P-O-M No. 8.** Rust- and corrosion-resistant resin base compound. Comes ready to use. Safe for all metals. Good paint primer; permits outdoor storage of subassemblies. \$3.30 per gallon, f.o.b. Dayton.

**PROTECT-O-METAL****G. W. SMITH & SONS, INC.****5407 KEMP ROAD, DAYTON, OHIO**

For more data circle 566 on Reader Service Card

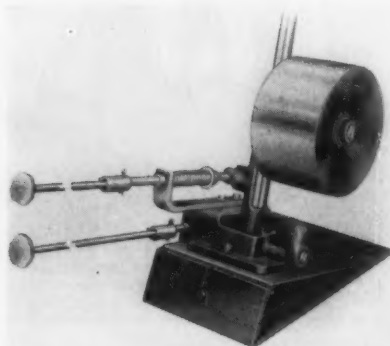
**MONEY-BACK TRIAL OFFER**

Order a trial gallon of each today for testing in your shop. We'll cancel the bill if you're not satisfied.

May, 1955

modern machine shop 321

**new shop equipment . . .**



**Hammond Bench Model 524 Backstand equipped with mounting bracket and front controls**

signed for production work on light polishing or deburring operations and will accommodate belts up to 4

inches wide. A mounting bracket for floor or wall mounting is available to facilitate easy installation. Extension controls for tracking and tensioning can be furnished so adjustments can be made at the operator's working position.

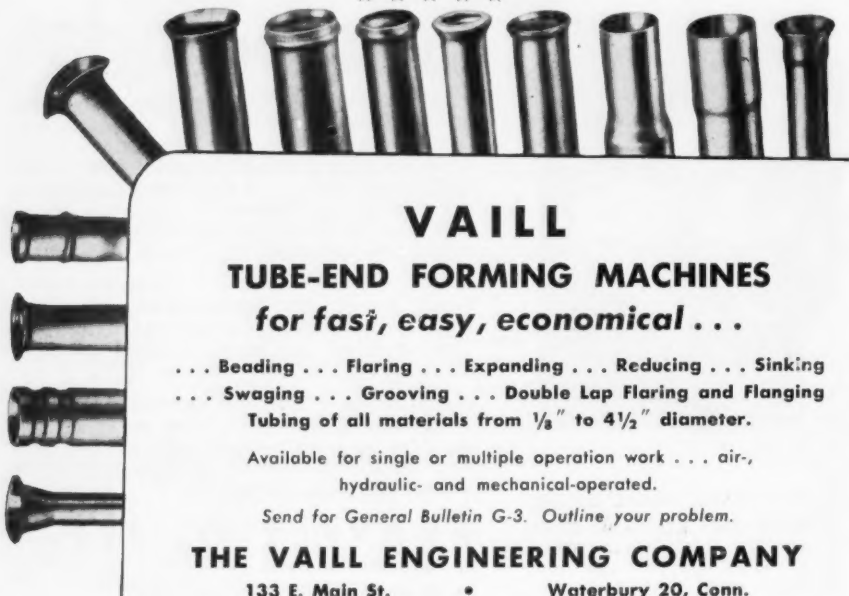
For more data circle 108 on Reader Service Card

★ ★ ★

**TAPPING ATTACHMENT HAS CAPACITY FROM NO. 6 TO 1/4 INCH**

Identified as the "500," a tapping attachment which has a capacity of from No. 6 to 1/4 inch has been announced by Tapmatic Corp., 845 W. 16th St., Costa Mesa, Calif. According to the manufacturer, the attachment operates on the "weightless tapping" principle and does not require any lead pressure by the machine operator during the

★ ★ ★ ★ ★



**VAILL**

**TUBE-END FORMING MACHINES**

**for fast, easy, economical . . .**

. . . Beading . . . Flaring . . . Expanding . . . Reducing . . . Sinking  
. . . Swaging . . . Grooving . . . Double Lap Flaring and Flanging  
Tubing of all materials from 1/8" to 4 1/2" diameter.

Available for single or multiple operation work . . . air-, hydraulic- and mechanical-operated.

Send for General Bulletin G-3. Outline your problem.

**THE VAILL ENGINEERING COMPANY**

133 E. Main St. • Waterbury 20, Conn.

For more data circle 567 on Reader Service Card

# CAMS

**MADE TO YOUR SPECIFICATIONS**  
**— Except Screw Machine Cams —**  
**Design Assistance Offered**  
**KIDDE PRECISION TOOL CORP.**  
**37 Ferrand St. Bloomfield, N. J.**

For more data circle 568 on Reader Service Card

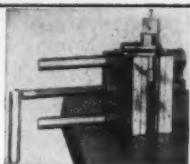
## CROSSLEY "Shur-Grip" Drill Vise

For fast, accurate  
 drilling, reaming,  
 tapping.

Built-in parallels. Handle swivels. V grooves hold rounds up to 2", both vertical and horizontal. 3-way vise holds square, rectangular and round parts.

Write for illustrated circular.

**CROSSLEY MACHINE & TOOL CO., INC.**  
**185 YORK AVE PAWTUCKET, R. I.**



For more data circle 569 on Reader Service Card

*You Need an Extra Hand Now  
 to Speed Up Production!*

### HEIMANN TRANSFER SCREW SETS



IN 11 SIZES—No. 6 to 1"  
 N.C. In all S.A.E. sizes.

Here is the faster, more precise way of transferring open and blind screw holes—make savings in "wage-dollars-per hour" of your expensive hands on every job. A die-and-tool maker's tool with many other applications for die makers and machinists. A set of 6 Hardened Screws nested in combination holder and wrench—no other tools needed. Get more work now—save money too!

**HEIMANN MFG., CO. • URBANA, OHIO**

For more data circle 570 on Reader Service Card

*You're not gambling  
 IF you have an **ACE** in the hole!*

ACE DRILL BUSHINGS are always a sure bet!

- Quality • Accuracy
- Largest Deliverable Stocks Anywhere!

Over 22,000 sizes, types and specifications in  
 A.S.A. and ACE standards, micro and super sizes plus  
 bushings for embedment in plastic or castable material.



**ACE DRILL BUSHING CO., INC.**  
 5407 Fountain Ave., Los Angeles 29, Calif.

Write For Catalog "E"

For more data circle 571 on Reader Service Card

## new shop equipment . . .

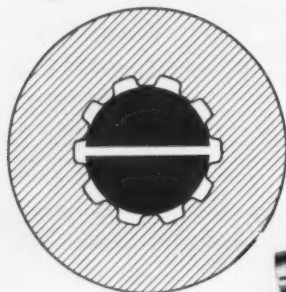
tapping operation, thus assuring uniform tapped holes, long tap life and fast tapping production. The attachment utilizes a positive torque adjustment clutch which is said to stop the tap instantly when the tap becomes dull, loaded, hits a hard spot or bot-

toms in a blind hole. The function of the clutch, it is claimed, is not affected by revolution-per-minute variations, oil or heat.

The reversing mechanism of the tapping attachment permits the instantaneous reversal of the tap at any time. The mechanism is so designed that the reversing torque is automatically adjusted simultaneously with the driving torque through the one adjustment of

the positive mechanical clutch. The reversing mechanism has an all ball bearing construction. The attachment incorporates a Jacobs Rubber-Flex tap chuck which, it is claimed, will accommodate all the taps within its rated capacity and does not require individual tap holders. The attachment is available with a

## Gages MINOR DIA. of SPLINES easily, accurately to fractions of .0001"



Because it is a UNIQUE expanding plug gage, Comtorplug easily gages inside splines that are difficult for other contact types of gages.



## COMTORPLUG with interchangeable expanding plugs to gage simple or special bores from 1/8" to 8" dia.

### Unique Advantages

- Positive gaging accuracy to fraction of .0001" regardless of who operates it.
- Indicates actual size, a fixed—not passing—reading.
- Positive 2-point gaging—automatic centering.
- Shallow holes, deep holes, inside splines, open-end holes gaged easily.
- Detects ovality, back or front taper, bell mouth, barrel shape.
- Reaches to bottom of blind holes.
- Gages work while still held in chuck.
- A shop tool for all-day every day use.
- Portable—no wires, hoses or stands.

Investigate the gage used by the thousands in jet engine, automotive transmission, household appliance, farm machinery, guided missile and other volume-precision plants. IT MAKES PRECISION GAGING EASY . . . at machine . . . at inspection bench . . . for selective assembly. No other like it—investigate and see why.

### COMTOR COMPANY

64 Farwell St.  
WALTHAM 54,  
MASS.



## GET THE FACTS—REQUEST BULLETIN 48

For more data circle 572 on Reader Service Card



Tapmatic "500"  
Tapping Attachment

## Standardize on **hall COLLET CHUCKS**

for  
**SPEED,  
ACCURACY,  
ECONOMY**



Automatic adjustment speeds up production in multiple operations with push-out type HALL COLLET CHUCKS. Full spindle capacity or over. Tremendous grip over or under stock size to .007—without adjustments. All grip...no slip. No bearings...no heat or lost power. Instant release without stopping lathe.

**SATISFACTION GUARANTEED!**

**Made in Two Sizes to Fit Your Requirements:**

Model A...1" (max. capacity 1-1/16")

Model B...2" (max. capacity 2-1/16")

Round, square or hexagon collets, plain or serrated

No. 3 Collet Pads Now Available

Write today for illustrated catalog and price list—Dept. B-5.

**HALL MANUFACTURING COMPANY**

823 TULAROSA DRIVE, LOS ANGELES 24, CALIFORNIA

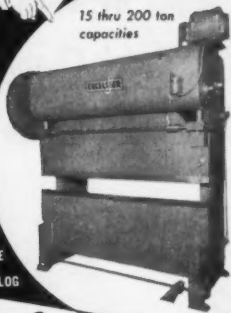
For more data circle 573 on Reader Service Card

MODERN IN DESIGN...VERSATILE IN PERFORMANCE!



**Excelsior PRESS BRAKES**

15 thru 200 ton capacities



- DURABLE
- RUGGED
- DEPENDABLE

Excelsior products have been proved by over a half century of continuous trouble-free service on the production line.

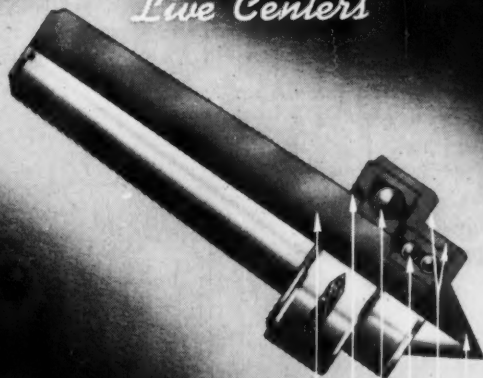
WRITE FOR CATALOG

**Excelsior TOOL & MACHINE CO.**  
31st and RIDGE AVE., EAST ST. LOUIS, ILL.

Makers of Precision Machinery for the Metal Working Industry Since 1892

For more data circle 574 on Reader Service Card

## ENGINEERED *Live Centers*



SHANK

THRUST BEARING

LARGE THRUST BEARING

LARGE RADIAL BEARING

CUSHION ACTION

ALLOY STEEL . . . . .

GROUND TRUE WITH BEARINGS

Standard shanks with Morse tapers carried in stock send us your specifications and blueprints . . . we will see that your job is set up with the right LIVE CENTER

For more data circle 575 on Reader Service Card

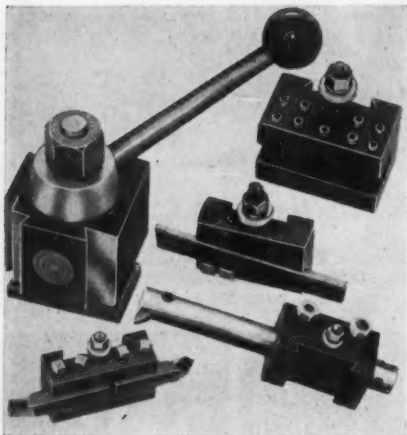
**STURDIMATIC TOOL COMPANY**  
3904 F STREET • DETROIT 16, MICH

# GET THE MAXIMUM

from your lathes by using the

## ALORIS "Quick Change"

# TOOL POST



Only a second to change tools for turning, facing, drilling, boring, reaming, cutting off or any other operation.

- GREAT REPETITIVE ACCURACY.
- RUGGED CONSTRUCTION.
- TESTED AND RECOMMENDED BY LEADING LATHE MANUFACTURERS.

Patented

Ask your dealer for a demonstration, or write for catalog today.

Some open territory still available for representatives.

MANUFACTURED BY  
**ALORIS TOOL CO., INC.**  
121-37 SANFORD AVENUE  
FLUSHING 35, N. Y.

For more data circle 576 on Reader Service Card

326 modern machine shop

new shop equipment . . .

No. 33 Jacobs taper and can be furnished with all sizes of Morse taper arbors.

For more data circle 109 on Reader Service Card

★ ★ ★

### PRECISION TOOL KITS

Following the popular do-it-yourself trend, S. J. Williams Precision Tool Kits, Inc., 4448 Soo Line Lane, Schiller Park, Ill., has developed 14 "DOIT" URSLF Precision Tool Kits designed for the toolmaker, machinist, student or apprentice who wants to make his own tools. Kits are available for the following tools: toolmaker's vise, magnetic parallels (in a variety of lengths, laminations and kinds of laminations), magnetic V-blocks (also in a variety of lengths and laminations), 5-inch sine block, V-blocks, and clamps. According to the manufacturer, all of the tools are easy to complete, and all materials are included with the kit. Easy-to-follow drawings also accompany each kit. An unusual innovation,



Williams "DOIT" URSLF Precision Tools

May, 1955



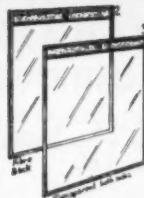
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8"

Jaws with  
SWIVEL BASES



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Machine Tool Ac-  
cessories. Write for  
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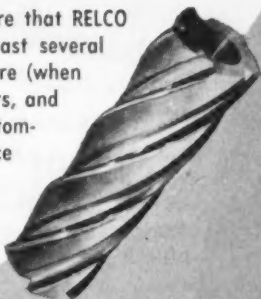
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9" LONG — 2 3/4" DIAMETER x 1 1/4" HOLE

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SPECIALIZING IN SPECIAL TOOLS • CARBIDE AND H. S. S.

For more data circle 580 on Reader Service Card

## **new shop equipment . . .**

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For more data circle 110 on Reader Service Card

★ ★ ★

### **LEAD HAMMER EXCHANGE SERVICE**

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*Podlin Three-Pound Exchange Lead Hammer*

the hand and to prevent loosening from the head. The lead is alloyed, and its chemical components are claimed to be accurately controlled to provide long hammer life.

For more data circle 111 on Reader Service Card

★ ★ ★

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- BROACHING
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Hydraulic presses made to conform to J.I.C. standards. Pictured at right is 15-ton hydraulic press.  
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MICRO  
DRILL  
GUIDE



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For more data circle 582 on Reader Service Card

## KENNAMETAL CUTTING TOOLS

for Increased  
Productivity

KENNAMETAL Inc.  
LATROBE, PA.



CEMENTED CARBIDE TOOLS,  
BLANKS, MILLING CUTTERS

For more data circle 583 on Reader Service Card

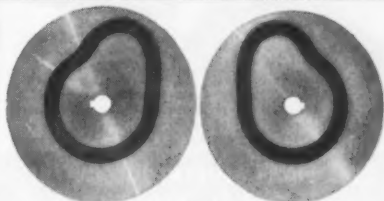
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A complete **INCLUSIVE** service

Every phase of cam technique is available here . . . from application, design and straight through production. Consult Rowbottom.

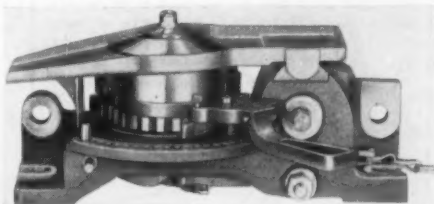
**THE ROWBOTTOM MACHINE CO., WATERBURY, CONN.**

Modern Cam Milling and Cam Grinding Machines are available from Rowbottom.  
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For more data circle 584 on Reader Service Card

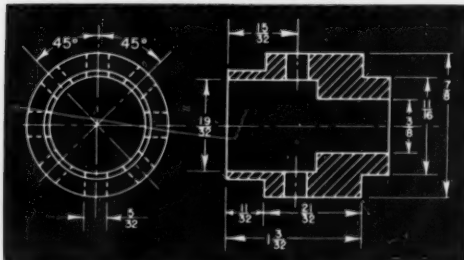
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5. Three models with capacities from  $\frac{1}{32}$ " to 2"

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Send blueprints or specifications  
of work.



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**J. W. DEARBORN**  
ANSONIA • CONN.

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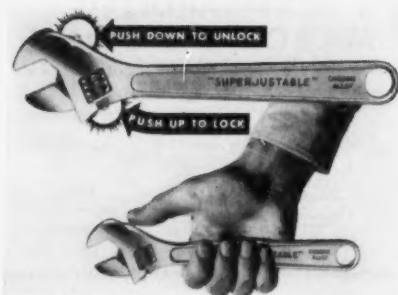
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increased facilities  
assures

## PROMPT SERVICE

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330 modern machine shop



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May, 1955



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Cut production time  
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curacy! Easy to set, easy  
to see, eliminates neces-  
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May, 1955



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modern machine shop 331

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Stays in place  
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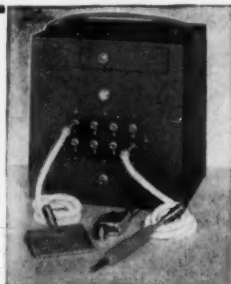
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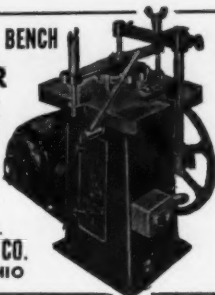
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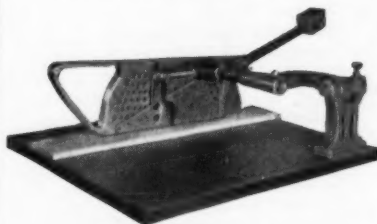
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May, 1955

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For more data circle 603 on Reader Service Card

modern machine shop 333

## where to get it

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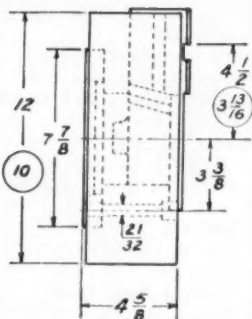
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KALAMAZOO, MICHIGAN



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For more data circle 604 in Reader Service Card

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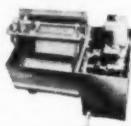


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**INDUSTRIAL FILTRATION COMPANY, 13 INDUSTRIAL AVENUE, LEBANON, INDIANA**

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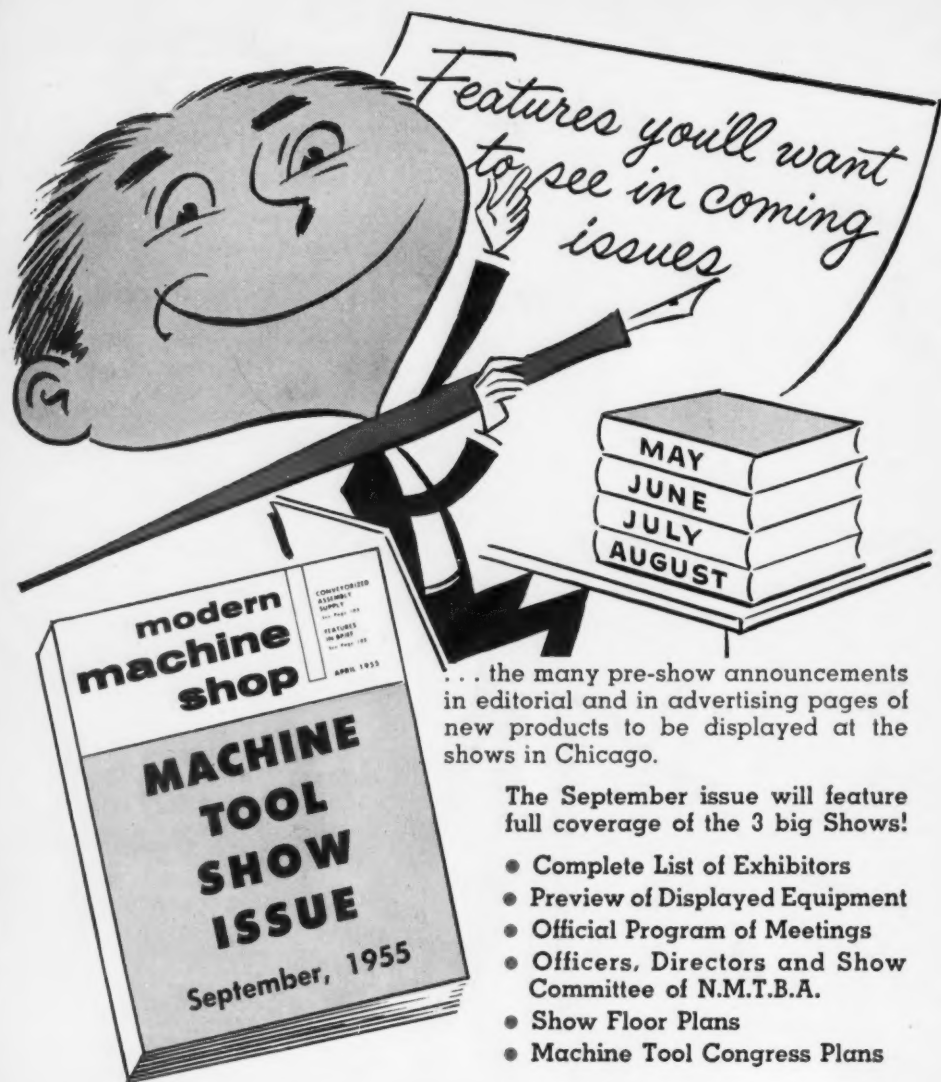
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May, 1955

modern machine shop 345

## the last word

By Fred W. Vogel, Editor

### SIMPLE TO THE COMPLEX

Human nature is a funny thing when you stop to think about it. In nature, itself, the simple forms of plant or animal life never quite seem to satisfy the human nature so man feels compelled and driven to improve, to develop the hybrids or the pure bred strains or something that is different. Nature, in itself, is quite simple until man gets hold of it and makes it complex.

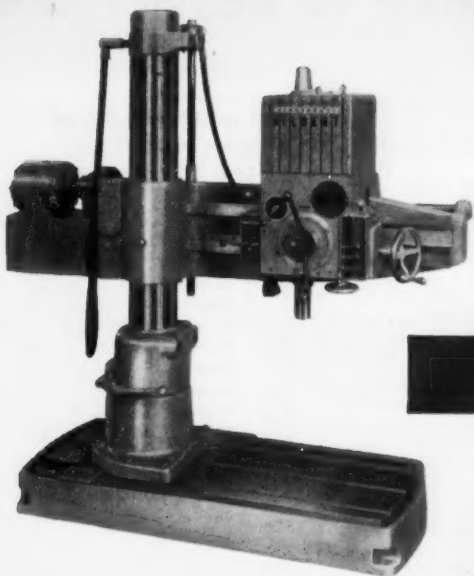
In the field of human relations, it is pretty much the same story. Do unto others as you would have others do unto you, is certainly basic philosophy and yet man spends much of his time in trying to find other solutions to human relations problem. The solutions are usually so confusing because man has departed from the simple and ranged into the complex.

As industry turns to automatic methods of performing work, it is evident that the designers of equipment are rapidly turning from simple structures, controls, circuits, and so on to more intricate and complex designs. The result of these changes

from the simple to the complex will, of course, result in the need for fewer workmen on the machines themselves. Those who operate the machines, however, will require a greater amount of training, as well as experience in the operation and maintenance of the machines. Industry, therefore, will require more highly trained men in the future. This brings us down to the point we would like to make in this message.

Each year, along about this time, students in our schools throughout the nation are beginning to think about the type of career they would like to follow in later years. Among these students may be your own child, a relative, or a friend. It seems to us that no better service could be rendered to this person and to the metal-working industry than that you encourage this person to seek a career in the field of engineering. An engineering education will provide the necessary background not only for creating but operating and maintaining the complex machines in tomorrow's industry.

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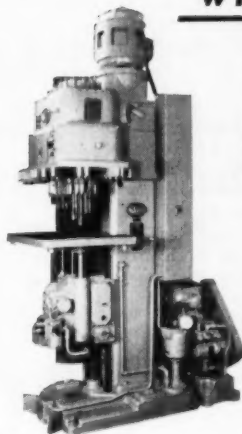
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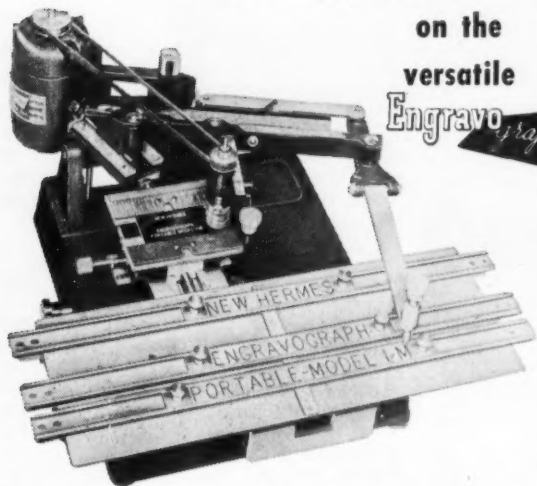
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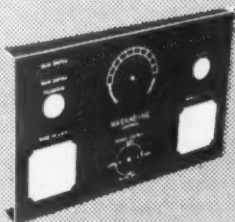
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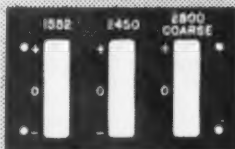
shear it



bend it



form it



punch it

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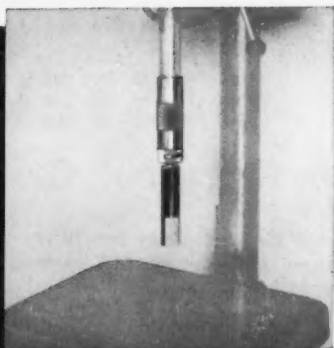
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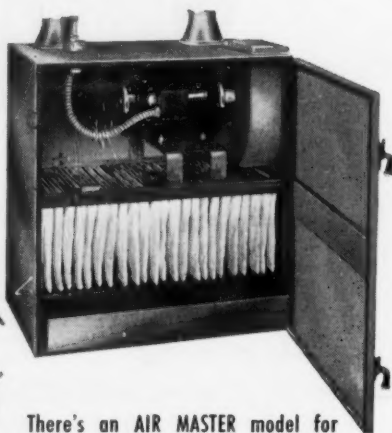
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May, 1955



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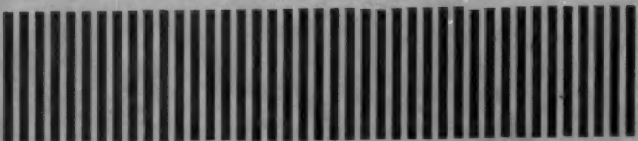
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FOR FULL DETAILS

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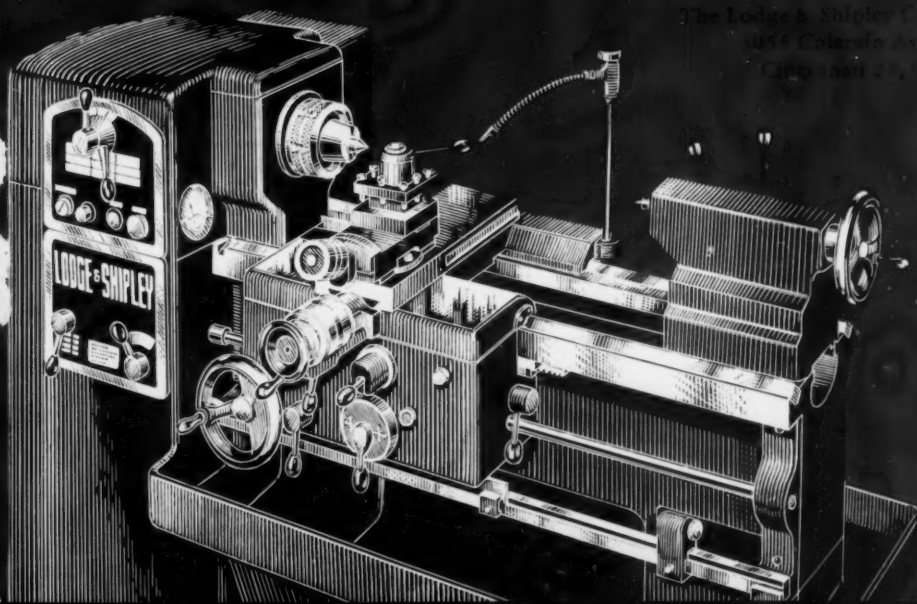
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